

TENNIS AND RACQUET CLUB, BOSTON, MASS.
Parker and Thomas, Architects

technology review

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THE TENNIS AND RACQUET CLUB, BOSTON, MASS.

It is the intention of the REVIEW from time to time to publish the work accomplished by former students of Technology, and this number contains a very interesting architectural composition from the office of Messrs. Parker and Thomas in this city. J. Harleston Parker graduated from Harvard in the class of '93, and Douglas H. Thomas, Jr., from Johns Hopkins in the same year. Immediately afterwards they came to the Institute. Mr. Parker later studied at the École des Beaux-Arts, in Paris, and on his return to Boston the partnership was formed. It was successful at once, both in Baltimore, the home of Mr. Thomas, and in Cambridge and Boston. Important responsibility was early placed on the shoulders of these young men, and their ability always to meet it, we hope, was due in part to their early training at the Institute.

The building here represented is the home of the Tennis and Racquet Club, on the corner of Boylston and Hereford Streets. It is one of the very best examples of vigorous and consistent design that has been seen in Boston for many days. The street is narrow, and the building is very properly designed to be seen close at hand and in sharp perspective; and the whole thing falls into superb harmony. This really very remarkable building is, besides, a brilliant

piece of color composition, and is about as good an example of the frank development of an exterior from interior conditions as one could ask. The building is absolutely fireproof, and is built of brick and stone, with iron framework and solid walls of brick. It is three stories in height.

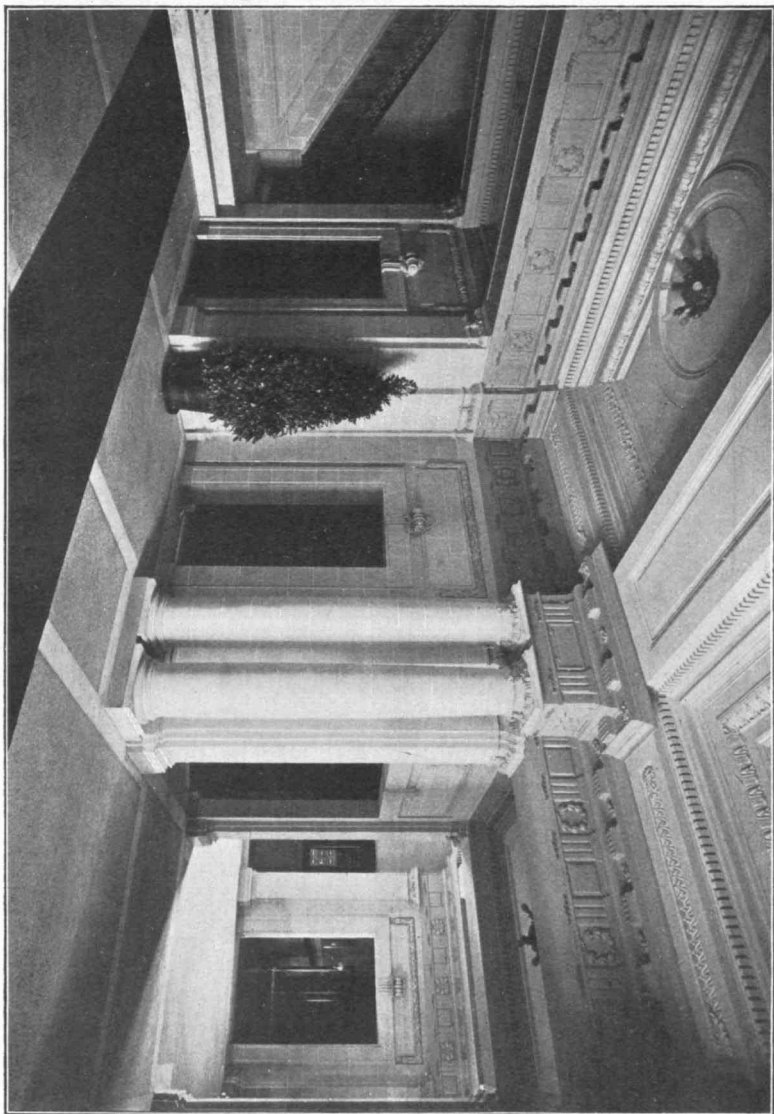
On entering the building from Boylston Street, one passes into a beautiful hall, finished in French Caen stone. The hall is 40 feet long and about 15 feet wide, and at the extreme end is a broad wrought-iron staircase, leading to the floors above. This hall, with its panelled ceiling and artistic finish, is in the style of Louis XVI., as, in fact, is the entire treatment of the interior.

To the left of the hall are the living and dining rooms, also the coat-room ; and on the right is the strangers' room, the main office, the bell-boys' booth, and the elevator ; and beyond the office is the billiard-room and a card-room. To the rear of the office is a café and bar and a private dining-room. The entrances from the hall to these various rooms are marked by columns, in pairs, of Caen stone, producing a somewhat formal architectural treatment.

The living-room is finished in oak, with a large limestone fireplace. The dining-room adjoining, which extends along the Hereford Street side of the building, is finished in mahogany. The dimensions of this room are 70 by 30 feet, so that there will be plenty of room for the future needs of the club in this respect. In connection with the office is a room for the clerical force.

The billiard-room is on the Boylston Street side of the building. Its dimensions are 54 by 26 feet, affording ample room for four tables ; and leading from the billiard-room is a card-room, large enough for four tables, and a writing-room for the convenience of members.

Perhaps one of the most attractively arranged rooms on



Entrance Hall

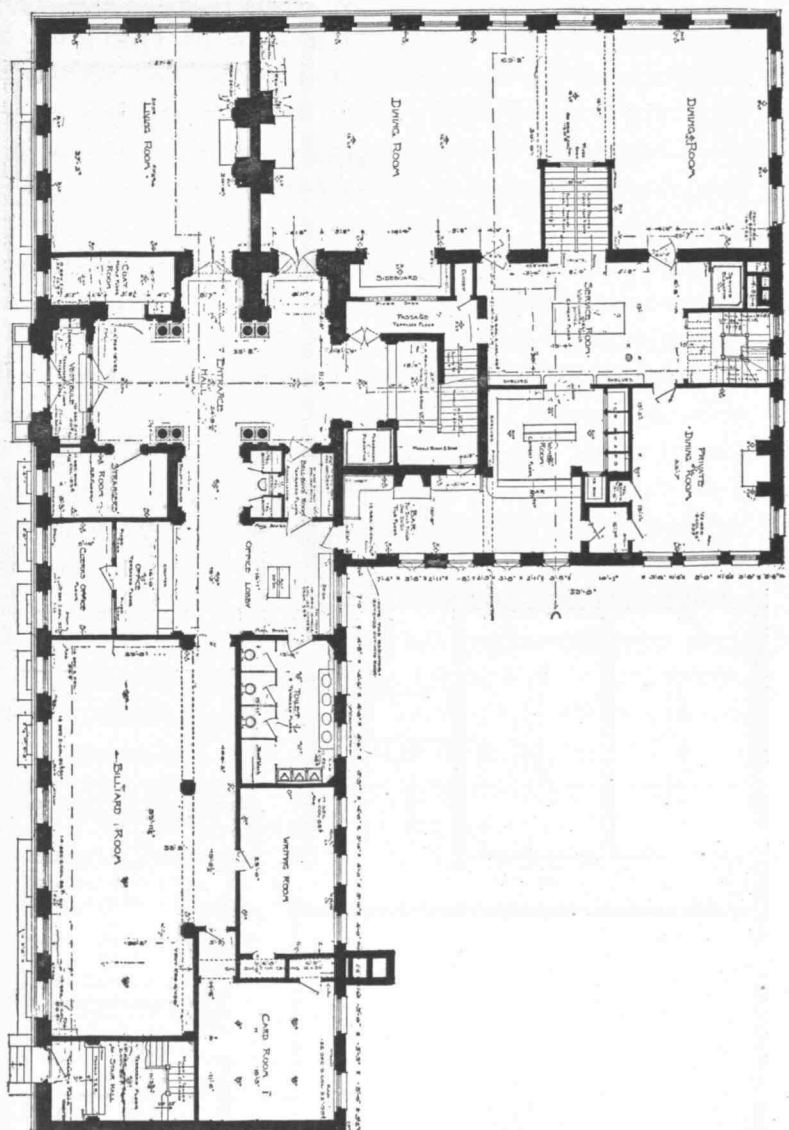
the ground floor is the bar. Here a Tyrolean effect is produced by a combination of exposed red brick, with the bar located between two columns, and around the sides of the room are rough, deep seats and tables.

The main service room is just beyond the hall, and centrally located, so as to be in close touch with every room on the floor. The kitchen is in the basement, and on account of the drop in Hereford Street is unusually well lighted. It is equipped with all the latest improvements for cooking.

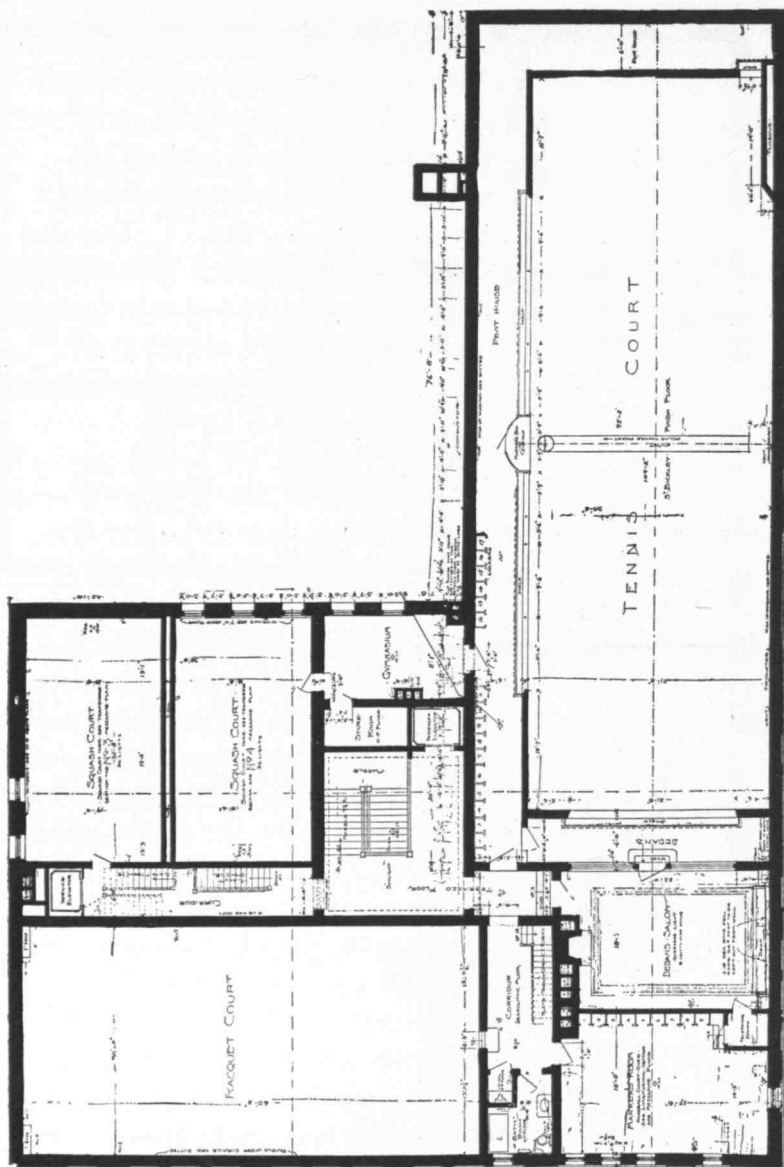
On the second floor the lounging-room, which fronts on Boylston Street, is probably the most popular room in the entire building. It has a beamed ceiling, with brick wainscoting, giving an unusual effect. There is an immense limestone fireplace, with big lounges placed about. In this room there is a large board where members sign for games, and a glance at this board will tell just what matches are on for the day or week.

Leading from the lounging-room is the dressing-room, with the baths beyond. The bath-room is finished in enamelled brick, and it is finely located in regard to light, as the sun breaks in from the west late in the day. The locker and drying-rooms are easy of access, the locker-room being only a step away from the dressing-room. There are three hundred lockers which are rented to members. Leading from the locker-room is a drying-room, and on the same floor, directly over the Boylston Street entrance, is a card-room, large enough for six tables.

On each landing of the antique-fashioned staircase of marble and wrought iron there are panel spaces, which will be used as a sort of "hall of fame" for the future club and national champions in tennis and racquets. Oak tablets will be inserted in these panels, and the names of the winners for each year will be inscribed thereon. On this



Floor Plan — Ground Floor



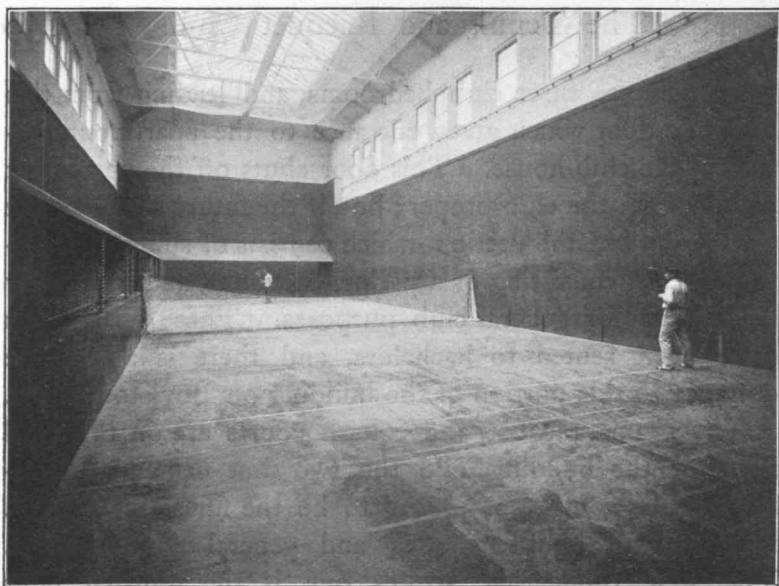
Floor Plan — Third Floor

floor there are three club bedrooms, and leading from this floor is a door which gives entrance to the apartment section of the club-house. This door shuts off the apartment section from the club proper; but, if the future needs of the club require it, this section, which consists of suites of apartments, each consisting of a parlor, bedroom, and bath, may be utilized for general club purposes. These apartments have been rented to bachelors, and there is a separate entrance to this portion of the building on Boylston Street.

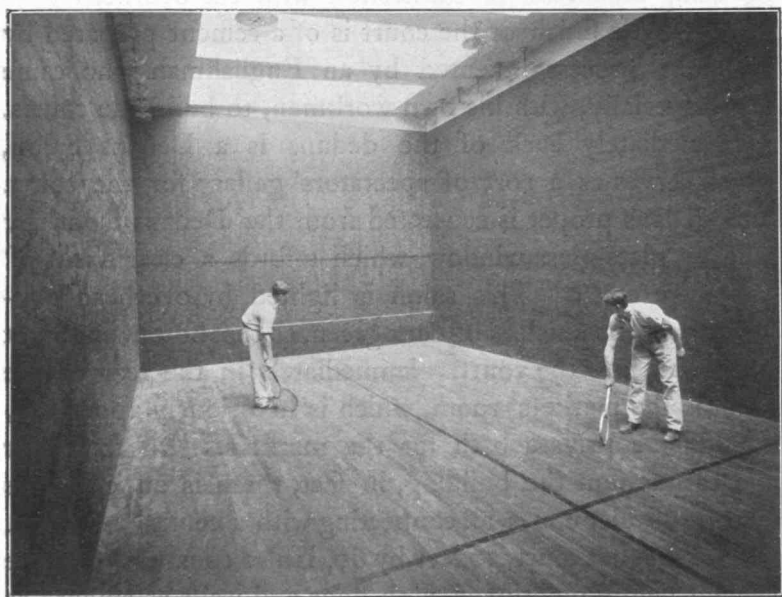
The tennis, racquet, and squash courts are on the third floor of the building, and the two first named are pronounced by competent judges to be the finest in America in regard to light, material, and general appointments. The first thing that strikes one is the unusual light that pervades the tennis court, and this is accomplished by using sidelights in connection with the overhead skylights. The finish of the court is of a cement prepared by a patent process invented by an Englishman who came over especially, with his own workmen, to build the courts.

Immediately back of the dedans is a Dedans Salon, which serves as a sort of spectators' gallery for the court. The dedans proper is separated from the Dedans Salon by a heavy plate-glass window, which affords a clear view of the entire court. This salon is lighted by overhead skylights, and the finish is of dark green, so that no outside light will break into the court. Immediately in the rear of the salon is the markers' room, which is luxuriously appointed, including a private bath for the markers. On this floor and throughout the building, in fact, there is an elaborate system of telephones, all connecting with a central exchange.

The racquet court, 30 feet by 60, is also constructed of the cement before mentioned, with floor and walls as smooth as glass. Here, again, the overhead light is used, and a new



Tennis Court

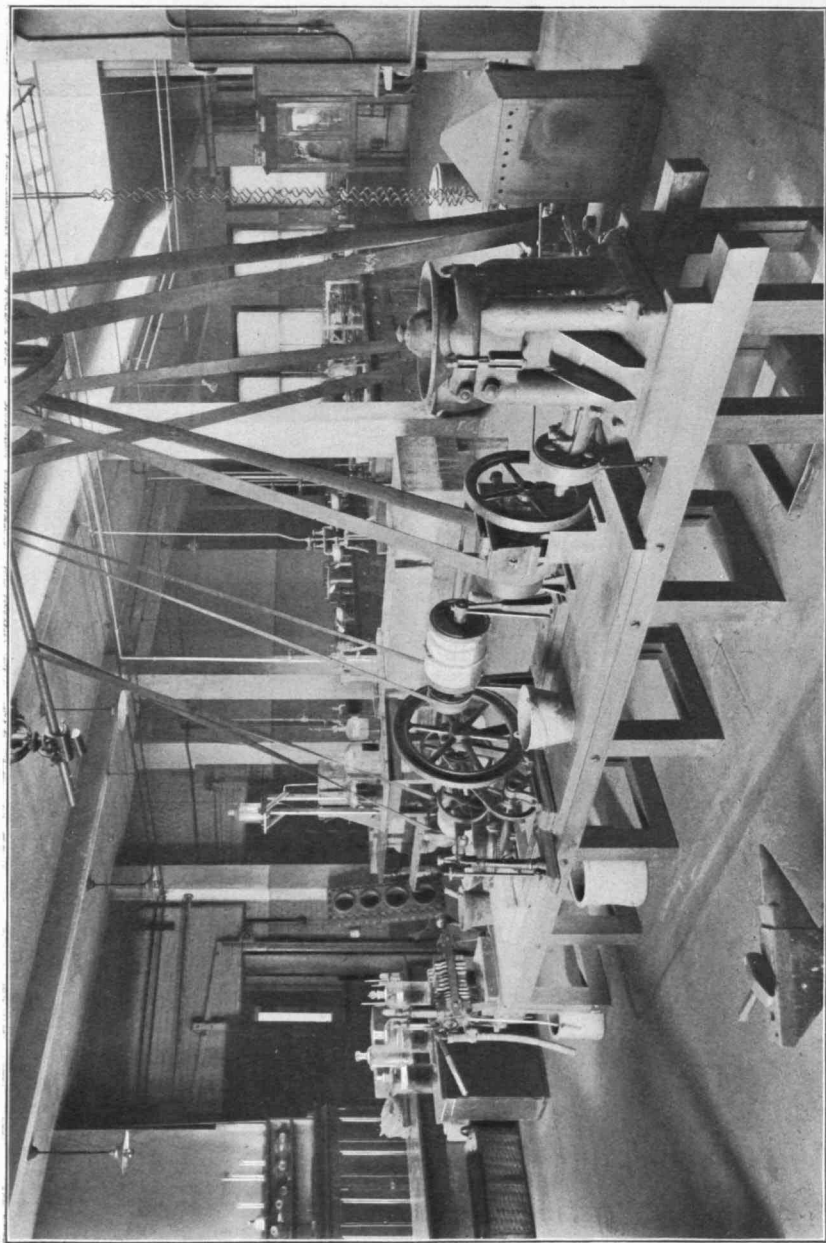


Racquet Court

effect is obtained in the gallery by having a top platform extending to the edge of the court, so that the spectators may see the play in every corner of it. The game of squash is more of an exercise pastime than a sport like racquets or tennis; and, realizing the growing interest in squash, the Tennis and Racquet Club has provided five courts, some of which are lighted artificially. Two of them are equipped with a splendid gallery, or what is technically known as a third-floor mezzanine story. These twin squash courts are lighted by thirty-six sixteen-candle-power lights.

Although the club is not an athletic club, there is a small gymnasium on the third floor, off the tennis court, where members may take light exercise with the weights and bag punching. It is hoped in the future that a covered lawn tennis court may be built in the rear of the building, on a lot owned by the club, and be connected with it. If this should ever be completed, the Tennis and Racquet Club will have a plant unequalled in the country.

FRANCIS W. CHANDLER.



General view of the Laboratory of Industrial Chemistry

A LABORATORY COURSE IN INDUSTRIAL CHEMISTRY

Industrial Chemistry, or to use a term now frequently employed, Chemical Engineering, may be regarded as the performance of a chemical reaction or a series of reactions on a scale sufficiently large and by a method sufficiently economical to enable the product to be sold at a profit. It might seem logically to follow therefore that a laboratory course in this subject should provide for carrying on a number of manufacturing operations on a large scale and under conditions that would permit of determining the degree of economy incident to each step in the process. This plan was evidently in the minds of the early workers in this field, for in the description of a laboratory course in industrial chemistry at the Institute appearing some twenty years ago, we read that "the laboratory work includes the preparation of acids, salts, and other chemicals from their raw materials; the refining of gross products; the preparation of pure chemicals; experiments in bleaching, dyeing, printing, and scouring; the extraction of fixed and volatile oils; the production of dyes, colors, paints and glazes; tanning; glass making; fermentation; distillation; destructive distillation." . . .

However efficient such a course as is here laid out might be were complete equipment and ample time for the work available, it seems from many points of view neither necessary nor altogether desirable. Without the most earnest endeavor and strongest financial support to meet the heavy running expenses, the great amount of work described above must inevitably retrograde into a more or less cut-and-dried series of inorganic preparations, which would in the end defeat the purpose of the course. The fact that a



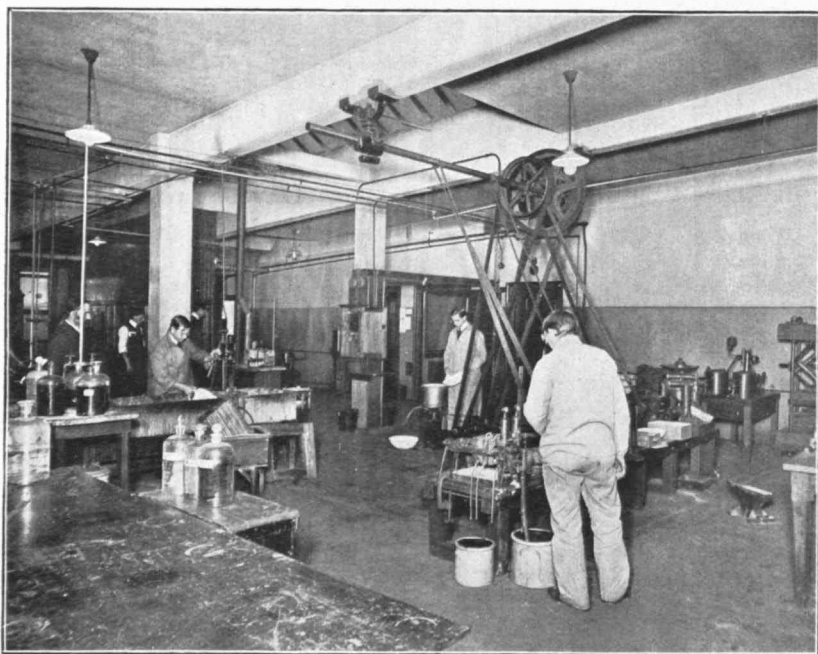
Laboratory for Textile Coloring and Thesis Work

chemical preparation is made on a scale which will furnish pounds of the finished product rather than grams does not in itself render the experiment industrial. Practically the only difference which the student sees, and generally the only one which in reality exists, between making barium nitrate, for example, in a fourteen-inch evaporating-dish and the same operation when carried on in a four-inch dish is the cost of the dish if broken.

In general it may be said that one of the important purposes which any laboratory course should serve is to illustrate and emphasize the work of the class-room. But, when one considers the endless variety of material and apparatus making up a chemical plant, and the multitude of reactions involved in general industrial chemistry, it is clear that comparatively few of these can be studied in the laboratory; and that those operations and processes which are made the basis of experiment should be selected not so much for their intrinsic merit or relative importance as for the ease with which they may be adapted to laboratory conditions and the exactness with which the several factors making up the final efficiency may be controlled. It may be shown also that the limited time and rather modest equipment usually devoted to this work should be applied to an exhaustive study of a few of those processes described in the lecture course, considered as types, rather than be devoted to a large number of scattered experiments, simply because the reaction by which each is accomplished be different. If the reaction alone is to be studied, it can be better done in the laboratory of general organic or inorganic chemistry. On the other hand, the details of factory practice may best be learned in the factory itself. It is my opinion therefore that, aside from familiarizing the student with some of those pieces of general apparatus which adapt themselves to re-

production and operation on a laboratory scale, there is not a great deal in a lecture course on industrial chemistry that can be efficiently emphasized by work in a laboratory.

The question may well be asked therefore: What is there to be gained by work in a laboratory devoted to industrial chemistry? In answer it may be said: First, that there is a new point of view to be obtained, or what might be



Apparatus for showing methods of Filtration

termed the Economics of Chemistry is to be studied. Throughout the other work in his course the student gives no thought to the relative cost of the material he uses. It is of no moment to him in analytical chemistry, for example, whether the reagent be cheap or expensive. If the analysis is to be completed, the reagent must be used. Likewise, if

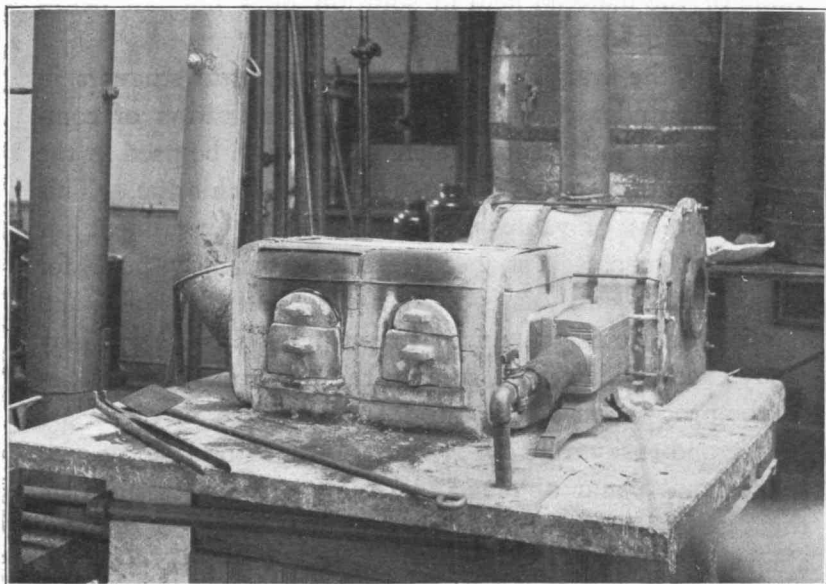
a precipitate is to be washed or a substance dissolved, water must be used, irrespective of its volume. If the resultant washings or solution be too dilute or of too great a bulk, the water must be driven off, regardless of the cost of evaporation. In industrial chemistry, however, a reagent may be used only when its cost does not raise the total expense of the process above a fixed maximum. A sludge or residue may be washed only to the point where the value of the material held in solution does not fall below the cost of driving off the water.

One of the first exercises given to Institute students in the course under consideration is the purification of common salt, the analysis of which is given, to be used in the electrolytic preparation of caustic soda and chlorine. This preparation is of value as an introductory experiment for several reasons. First, because salt sufficiently pure for commercial electrolysis is itself a very cheap material, and the cost of the reagents used in purifying a crude salt may easily exceed this value; second, the mechanical difficulties of the process are small; third, the reactions involved are simple and easily controlled; and, fourth, a good result may be demanded and obtained. Although the necessities of the case have been carefully explained, the student will almost invariably propose throwing out the iron and aluminum by means of ammonium hydrate, separating the calcium as oxalate and the magnesium as phosphate. He is here using the knowledge gained in his study of Qualitative Analysis, and this is eminently desirable; but, although he knows a thing to be possible, he must also ask himself: Is it practicable? It does not here occur to him that not only are these reagents very expensive, but that he is contaminating his salt with ammonium chloride.

It is usually a revelation to him to find that anything so

“scientific” as a solubility table is of value in determining the volume of water necessary to handle a given weight of salt, that anything so unscientific as a Beaumé hydrometer is an instrument with which he must ultimately become familiar, that boiling off water is expensive, etc.

Whether such an experiment is considered successful or not depends not only on the purity of the product or the percentage yield, but upon the cost of the finished product



Experimental Furnaces

as determined by the cost of the original salt and the materials used in its purification. The statement of the results of the operation should show the weight of salt taken, the amount added in the form of reagents, the amount returned to the system as mother liquor, that sent back to the water supply in the form of wash water from the various precipitates, and the weight of pure salt recovered either in the form

of brine, as determined by its density, or recovered as pure crystal salt. Great care should be taken to impress upon the student that the value thus obtained does not represent the manufacturing cost of the purified salt; that the very important factors of labor, interest on investment and depreciation of plant have not been included.

It has been urged that no estimate of the amount of water necessary to carry through a given process can be made on account of the enormous evaporation which takes place in a sixteen-inch evaporating-dish when compared with a twelve-hundred-gallon vat; that no adequate idea of the temperature at which a solution may be best filtered can be obtained on account of the excessive radiation from so small a filter or filter press, etc. These difficulties are more imaginary than real. The first, for example, may be overcome completely by weighing the dish and contents when an operation is commenced. As the experiment proceeds, the dish is from time to time replaced on the scales and the water necessary to make up the original weight added. No account is taken of this water: it being introduced simply to eliminate the unavoidable error due to excessive evaporation, and is so understood by the student.

The influence of the mechanical difficulties inherent in carrying on a given process as contrasted with the cost of raw materials, is well shown in the preparation of barium nitrate. This chemical is made in two ways: first, by dissolving the native carbonate, witherite, in nitric acid, and separating the salt from the impurities in the resultant solution by fractional crystallization; and second, it is prepared by heating barytes, the native sulphate, with coal and waste calcium chloride, leaching the barium chloride thus formed from the melt, and subsequently separating out barium nitrate by boiling the chloride with crude sodium nitrate

(chile saltpetre). In the first method the raw materials are expensive, but the process extremely simple and the cost of plant and labor small: in the second the raw materials are comparatively cheap, but the process longer and more complicated, while the plant is expensive and the cost of labor heavy. Depreciation is light in the first case, and, especially in the furnacing operation, heavy in the second.

These processes are carried on in the laboratory in such a way as to determine with considerable accuracy many of the factors necessary to form an opinion as to the relative final economy of the two. Incidentally, the student, in preparing his raw materials, studies the various types of crushers and grinders and mixers available. The standard kinds of apparatus used in separating solid from liquid—as, for example, suction filters, centrifugals, and filter presses—are employed at different times during the process to demonstrate the kind of work for which each is adapted. Results of this nature are necessarily limited to the equipment with which the laboratory is provided; but even with a modest plant, enough may be done to render this aim of the course of material value.

The laboratory has, of course, its limitations, and in determining the depreciation of the apparatus used in a given operation, this limit is very soon reached. Such matters as labor, cost of plant, interest on investment, insurance etc., do not lend themselves at all to laboratory treatment. On the basis of the experiments, however, they can be discussed in conference with greater profit and to a much better advantage than if the laboratory work had not previously been done. The student is made to keep not only descriptive notes, but critical observations giving his opinions and recommendations on the various steps in the process. These also may be made the subject of

class conference and discussion. The series of preparations is so selected that each one will introduce a new feature, and, when considered as types and exhaustively carried out, cannot fail to widen the mental horizon of the operator.

In addition to acquiring a general idea of what the factors are which enter into an industrial problem, the student may at the same time have awakened in him an interest in what has been termed the "spirit of research." Thus an experiment which has been introduced to illustrate a particular principle or method may be given the form of an investigation, having in view the solution of a more or less technical problem. The conditions influencing or controlling the result may be systematically varied in such a way that each man or group of men will, in performing the experiment, contribute data toward its solution.

A good example of this idea may be found in the electrolysis of brine for the production of bleaching liquor. This experiment is of value from an industrial chemical point of view as an example of the application of electricity to the production of a chemical substance; as an exercise which involves the practical use of amperes, volts, watts, the electrochemical equivalent and the relation between the energy in kilowatt hours expended and the value of the resultant product. But it is also valuable because there are a number of distinct conditions which have a vital influence on the result, and which can be separately varied, but yet controlled. The cost of the bleaching liquor resolves itself largely into the cost of power and the cost of salt. These two factors are affected in opposite ways by the current density, the strength of brine used, the temperature of the brine and the concentration of available chlorine in the finished liquor. Three or four men are required to operate under identical conditions, so that by taking the average as

the correct result the personal error is more or less eliminated. Then by having the next few men perform the experiment under conditions varied according to some thoroughly discussed and predetermined plan the effect of the variation on the economy of the process may be observed. This practice not only lends an added interest to the work as a whole, but it tends to give that analytical attitude of mind which is so essential to successful experimentation,—a training which is too generally neglected until the last term of the fourth year, when the student begins his graduation thesis.

Another important feature of the work is the preparation of a written report upon some problem the solution of which has been attempted in the laboratory. This is not simply a recalculation or working up of data obtained during an experiment, or a more or less verbatim copy of the laboratory notes, but a logical, critical, and, as far as possible, convincing digest of the proposition as seen in the light of the laboratory work,—such a report as the chemist of a works would make to its superintendent. For example, a report on the manufacture of barium nitrate will discuss the occurrence and cost of raw materials; a critical review of the methods of manufacture carried on in the laboratory, with a study of the advantages and drawbacks of each; a discussion of the approximate cost of plant and labor; the uses and market value of the finished product; the value and disposal of by-products, etc. This will be far from a complete report upon the subject, and its limitations are clearly understood and appreciated by the class. But the ability to write up laboratory notes in a tangible, readable, easily-get-at-able form is so uncommon that any exercise that tends to strengthen a student's command of English is of value, even though the production from a technical standpoint be incomplete.

It is essential that somewhere in his college course the student should have pointed out to him the value of a well-kept note-book, not only as a record of experimental data obtained, but as legal evidence in case the matter contained therein becomes the subject of litigation. The Institute student is very prone to erase and rewrite an entry in his note-book; to tear out a page and start again; or to make his original entries on a loose sheet of paper, to be later copied into his regular laboratory book. He should be shown that for notes to be of value as evidence they should be regularly dated and, at least occasionally, signed; that erasures should be avoided; that they must be original entries, not copies; that, if for purposes of instruction a page is to be rewritten, the discarded portion may be "removed from the sphere of action" by pasting labels on the edges, but under no circumstances torn out. A mutilated note-book discredits both the work and the worker.

Another feature of the work of the more advanced students of Course X. is the design of special parts of a chemical plant from the data obtained in the laboratory work. This has been made possible through the kindness of the Mechanical Engineering Drawing Department. Mr. James Lund ('81), of the Cochrane Chemical Company, and Mr. H. S. Kimball ('91), Consulting Chemical Engineer, have also been of great assistance in getting this part of the work started; and I welcome this opportunity for expressing my appreciation of the interest manifested in the undertaking.

As a further advantage possessed by a course in industrial chemistry, though in no way limited to it, may be mentioned a certain mental stimulus which it furnishes to original, independent thinking. It is a generally recognized fact that, although the proper amount of fats, carbohydrates,

proteids etc., to nourish the body be furnished as rations day after day, unless the quality of the food be varied, the appetite and digestion gradually fail. To a certain extent this analogy holds in that accumulation of facts and experiences sometimes known as technical education. If each day's work be looked at and thought of from the same point of view, the student's mental digestion is impaired. Even though the subject of mental discussion be the same, if the point of view be changed, the mind is refreshed. If, for example, after studying the speed of migration of the ions and their transference numbers as a problem in theoretical chemistry, the same subject be taken up in an attempt to increase the concentration of caustic soda in the effluent from an electrolytic cell, the student can work with greater mental vigor than if he continued to think upon theoretical problems alone. Each exercise assigned him in this work is a small investigation, for the successful completion of which he must use knowledge already acquired; he must assimilate some of his "undigested facts"; he has thrust upon him the necessity of thinking independently; and this, in turn, fosters a spirit of self-reliance.

Such a course will never take the place of an apprenticeship in a factory or works,—will not make a finished engineer; but it will contribute toward giving that method of thought and work which produces the man "who knows what to do when there is something to be done."

WILLIAM H. WALKER.

THE JUNE REUNION *

The year 1904 will be marked by two notable events in the history of the Institute,—the general Reunion of Institute men in June and the Centennial Commemoration of President Rogers's birth in December. Separated in time and distinct in character, they supplement each other in the common purpose of broadening and deepening loyalty to Technology.

The plans for the June Reunion have been vigorously developed since the last issue of the REVIEW, and have met with a most cordial response from Institute men in all parts of the country. Early in March a general announcement was mailed to the twenty-seven hundred graduates and about half as many other former students,—REVIEW subscribers, associate members of the Alumni Association, members of the Technology Club, Walker Memorial contributors, and others suggested by representatives of the classes. The invitations will include also present and former members of the Faculty and members of the class of 1904. Reprints of the articles by Dr. Pritchett and Mr. Fay in the January REVIEW formed a part of the announcement. The replies have come in unexpectedly large numbers. Up to April 25 there are no less than 1,024 provisional acceptances, without counting other persons—probably several hundred—who will attend as guests. While a great majority of the acceptances come from Massachusetts, the number from other States is by no means inconsiderable. New York leads with 98; Pennsylvania comes next with

* The statements of this article are as definite and complete as they can be made at this time. The official preliminary program will be issued about May 10th.

41; Illinois, third with 33. The only States of the Union which are not yet represented are Arkansas, Florida, Kansas, Mississippi, Nebraska, Nevada, North Dakota, South Carolina, South Dakota, Tennessee, West Virginia, and Wyoming. Eight men come from the Pacific Coast. The total number from outside Massachusetts is 363, including three from Canada and three from Mexico.

The record by classes is not less striking. Of the 1024, 1898 and 1903 lead with 65 and 70 respectively, 1893 coming third with 65; but this periodic law of numerical leadership does not extend to '88, '83, and so on. Every one of the thirty-six classes is represented, two being the smallest number from any.

A detailed circular of information will be issued to the entire constituency of 4,000 about May 10, with information in regard to the programme, hotels and other accommodations, registration, transportation, etc. Plans showing the location of the Institute buildings will be sent, since some will be present who have no acquaintance with any building but Rogers. The active and influential committee of the North-western Association has secured a round-trip rate of one and one-third fares, and it is expected that this concession will be made general, at least for persons coming from outside New England. The circular of information will be accompanied by a return card, on which the recipient will be asked to indicate the extent to which he desires tickets for the main events of the general programme; and there will be a discreet suggestion that replies accompanied by checks will receive special consideration. By this means the committee expects to be able to form by May 25 a reasonably close estimate of the attendance at the reunion, and to make its plans accordingly.

Graduation — or Reunion — Week begins on Sunday,

June 5, with the baccalaureate sermon; and friends from a distance will arrive on that day and the next in large numbers. The preliminary information will include directions for proceeding on arrival to the official headquarters in the Henry L. Pierce Building on Trinity Place. This building will be unfamiliar to some of the older men, but it is convenient of access from the inward southern (Back Bay and Huntington Avenue) stations, as well as from the Boylston Street electric cars; and it has the further advantage of attractive quarters for visiting ladies in the Margaret Cheney Room, and of other rooms, large and small, adapted for registration, receiving committees, and other purposes of hospitality. It is, moreover, sufficiently detached from the gay crowds which fill the Rogers Building during Class Day. The Association of Women of the Institute and the ladies of the Faculty will be represented by members in attendance at the Margaret Cheney Room, and many classes are expected to have delegates in the Pierce Building on Monday to meet the arriving strangers. All will be expected to register, but this will not imply the usual entrance examinations. On the contrary, the sequel will be the presentation of a valuable and elegant badge identifying its possessor with the Tech Reunion and with his own class during the three days, and serving as his open sesame everywhere. It may not be practicable to provide a printed list of members in attendance, but pains will be taken to keep addresses on file for convenient reference and exchange of information.

Visitors who have not already received tickets for the dinner and other festivities will secure them, if any remain, at the time and place of registration, and railroad certificates will be there deposited. Arrangements will be made for receiving orders for photographs of Presidents Rogers, Pritchett, Walker, Runkle, and Crafts.

The plans for the afternoon of Monday will be of a relatively simple and elastic character. Class Day will be in progress in the Rogers Building, and may form an interesting novelty to some of the earlier classes for whom graduation was not even a figure of speech. Opportunities will be offered for trolley trips in the "Seeing Boston" cars, and there will be a general renewal of acquaintance in and about the headquarters and at the Technology Club.

On Monday evening some of the classes will hold their dinners. The main feature of the day, however, will be the Evening Reception tendered by the Corporation and Faculty of the Institute to the classes from '68 to '04. For this purpose the Institute has been so fortunate as to secure the use of the Museum of Fine Arts. No other place could compare with this in attractiveness, and the courtesy of the Trustees of the Museum is highly appreciated. Special efforts will be made to secure the attendance of former as well as of present members of the Faculty, and there may be opportunity for a definite location of classes or departments which will bring persons of common interests together, and enable the returning graduate, young or old, to find the friends he wishes most to meet. The reception will naturally include ladies accompanying members.

Tuesday will probably furnish the most convenient opportunity for visits to the Institute buildings and departments. Members of the Faculty will be largely in attendance in their departmental offices, and junior members of the instructing staff will act as guides and information agents. Persons not devoting the morning to an inspection of the Institute may find it of interest to explore the city and suburbs or to pay social visits. The older graduates will find much of engineering interest in the Subway and the new railroad terminals and other recent improvements.

Others will take advantage of the wonderful network of suburban trolley lines to see something of the outlying towns at this most attractive season. Informal parties may be arranged for visiting points of interest in Brookline, Newton, Cambridge, Lexington, Concord, Salem, etc.

Tuesday afternoon is the time for the graduation exercises, but it is not anticipated that any large proportion of the visitors will desire to be present at this ceremony. The afternoon will be devoted mainly to the holding of class and fraternity spreads in the various hotels near the Institute. In the case of the smaller classes, several are likely to combine for this purpose, and an interchange of visits will be possible. The main event of the day will be the Tech Night at the "Pop" Concert at Symphony Hall. The graduate of recent years needs no description of this most festive occasion; and, as to his elders, they must see in order to appreciate. The entire floor of Symphony Hall will be reserved for the reunionists, and the galleries will be available for the ladies attending. On this evening, preceding the "Pops," will be held the dinners of those classes which have not held them on Monday evening.

Wednesday is to be one of the rarest days in June by special dispensation of the Weather Bureau, and will form the grand climax of the week. One or more steamers of ample size will be chartered for an all-day harbor excursion for members and ladies along the North Shore and to the new State Reservation at Nantasket.* The fact that Nantasket has been made a part of the great Metropolitan Park system may be noted for the information of those members whose acquaintance with it is not of recent date. Luncheon will be served and there will be opportunity for numerous

*An alternative plan for the Wednesday excursion is under consideration, but details cannot yet be stated.

sports and diversions, aquatic or amphibious, in the afternoon, the exact character of these *entr'actes* remaining for the present a profound secret with the chairman of the Excursion Committee. The return to Boston will be made late in the afternoon, but with sufficient intermission before the grand Tech banquet, which will bring the reunion to a fitting conclusion. For this banquet the committee has secured the ball-rooms of the Hotel Somerset, where provision can be made for seven hundred persons. Even here, however, it is improbable that guests can be admitted. The location of this fine hotel in the Back Bay Fens renders it particularly attractive at this season. The dinner will be followed by addresses by President Pritchett, Governor Bates, and other distinguished speakers to be announced in due time.

Beyond Wednesday the committee will present no programme, but it is hoped that many of the visitors, especially those from a great distance, will prolong their stay in Boston and extend their acquaintance with the local Institute men.

The organization for the June Reunion is as follows:—

General Committee: S. J. Mixer, '75, chairman; J. P. Munroe, '82, vice-chairman; A. G. Robbins, '86, secretary; E. G. Thomas, '87, treasurer; additional members representing the Alumni Association, the Technology Club, the Class Secretaries' Association, and the Faculty.

The Executive Committee includes the four officers named above and the chairmen of the sub-committees, as follows:—

Class Dinners: F. H. Fay, '93.

Decorations: H. W. Gardner, '94.

Excursions: I. W. Litchfield, '85.

Headquarters and Registration: C. F. Park, '92.

Hospitality : G. V. Wendell, '92.

Hotels and Accommodations : W. B. Snow, '82.

Programme : J. P. Munroe, '82.

Publicity and Correspondence : H. W. Tyler, '84.

Reception for Monday : Professor M. T. Sedgwick.

Transportation : E. G. Thomas, '87.

In connection with the Programme Committee there will be sub-committees on Music : F. F. Bullard, '87 ; and Arrangements for the Concert : L. W. Pickert, '93.

The Committee on Class Dinners will collect information in regard to available accommodations at hotels of convenient location and for the guidance of the class secretaries or committees.

The Committee on Decorations will have general charge of decorations in connection with the reception, the dinner, and the concert.

The Committee on Excursions will plan the Wednesday excursion and lunch, and will also prepare information in regard to trolley trips and other local excursions which may be taken by independent parties or persons.

The Committee on Hospitality will attend to all those numerous details which will make every visitor feel that Boston is for the time his home. Emissaries of the committee will endeavor to be wherever they can assist, without being anywhere superfluous.

The Committee on Hotels and Accommodations will gather and furnish on inquiry information in regard to location and rates of the more eligible hotels and perhaps of a small number of boarding-houses. An effort will be made to secure a considerable number of rooms for men in the new Technology Chambers, a private dormitory. A list of hotels with rates will be included in the May circular, and any earlier inquiries will receive due attention. It has been

suggested that local graduates will to a considerable extent entertain visitors at their homes, and lists of visitors expected will shortly be sent to class secretaries as a basis for personal invitations.

The Committee on Transportation is making vigorous efforts to secure minimum rates from railroads in all parts of the country, and results will be reported in the May circular.

It is the policy of the general committee, while making the reunion in the main self-supporting, to keep the expense within the reach of all, that all may co-operate to make the first Tech Reunion a success for the present and an inspiration for the future.

H. W. TYLER, '84.

For the Committee on Arrangements.

THE PROPOSED HARVARD-TECHNOLOGY
"MERGER"

In view of the free public discussion of a proposed union, alliance, or "merger" of the Massachusetts Institute of Technology with Harvard University, it may be of interest to the readers of the REVIEW to see gathered together the principal newspaper comments regarding the plan. The first recent announcement of such a proposition was made in the *Boston Daily Advertiser*, and was followed within a few days by the following statement in the *Boston Evening Transcript* of January 23:—

ALLIANCE, NOT UNION

An alliance of Harvard University and the Massachusetts Institute of Technology is among the educational possibilities of the next few months or years. Whether it is a probability is quite another matter. If it should be brought about, it will be an alliance, and not an absorption of one institution by the other. The result would be the limitation of the Lawrence School at Harvard to pure science, and the transfer of all Harvard engineering instruction to Technology. In the conduct of the latter the Harvard authorities would, no doubt, claim, and receive, a voice; but it is very doubtful—almost impossible—that Technology will be absorbed by Harvard. To become the "Massachusetts Institute of Technology, affiliated with Harvard University," might be acceptable to the authorities of Technology; but to become simply a department of Harvard, with consequent loss of individuality, name, and high reputation as a technical school, would scarcely find favor with either the Technology management, graduates, or students.

There is no question that the feasibility of some *modus vivendi*, if nothing closer, has been compelling the best thought of the authorities of both institutions for some time. The reason is not

some chance remark of Andrew Carnegie, nor the circumstance that Gordon McKay left some millions of dollars for technical education at Harvard. These happenings are merely superficial symptoms of the fundamental cause. What is compelling the attention of the Harvard Overseers and the Technology Corporation is the ineconomy, the actual waste, of money and brains and energy and accomplishments, involved in the upbuilding and maintenance of two rival technical institutions, three miles apart. With the competition of the great universities of the West — State subsidized, and virtually giving away instruction and training — Technology and Harvard can maintain their reputations as technical schools and hold their students, despite high tuition charges, only by keeping ahead of the procession in methods and results. That means lavish expenditure of money and effort.

Can that be done successfully by two institutions on opposite banks of the Charles, and each maintain itself in the first rank? Will there not be in Boston, rather, one first-class technical institution and one second, third, or fourth-class one; or, even more likely, will there not result two second-class schools? Is not the situation one which calls for something that might be called a community of interest, a trust in education, if you please? These are the fundamental questions, the solution of which is troubling the powers that be at Harvard and Technology.

It is a condition of things too grave for the admission of technicalities, and it is not to be believed for an instant that the broad-minded men at the helms of these two Institutions will stand on ceremony in seeking the best course. It has been said that overtures should come from Technology, since an earlier series of negotiations is said to have been broken off by the Institute. If that were so, Dr. Eliot and his Overseers are too big men to insist on precedent or precedence; and, as a matter of fact, it might be questioned whether one was more responsible for the failure to reach results in 1897-98 than the other. Petty points like this are no more likely to stand in the way of frank discussion of the situation by the authorities of the two institutions, singly and together, than are the numberless personal equations which would almost surely

block results if they were given consideration. It is a large subject, and calls for large treatment by large men.

At the present time the idea has scarcely arrived at the dignity of a project. No negotiations are under way. Members of both corporations are thinking out the problem singly, are discussing it in little groups, as they meet from day to day; but there is the best of reason for saying that in neither body, up to the present time, has the matter of affiliating the two institutions been formally broached. That stage, however, may be reached shortly.

It goes almost without saying that a host of interesting possibilities are involved in the successful consummation of what is to-day merely a scheme. With her large real estate holdings, recently augmented by the State's gift of the two-thirds of the Back Bay block occupied by her main buildings and her vested funds, Technology would not come to Harvard a dowerless bride. The question of a new site for the Institute, which has been occupying much of its authorities' time and thought, would be settled naturally in favor of the suggested removal to the right bank of the Charles, not far from Soldiers' Field. As has been stated, the Lawrence Scientific School at Harvard would become a school of pure science. Engineering would be centred in the Institute of Technology, enriched by the Harvard endowments for that specific purpose. For instance, instead of two laboratories for electrical engineering, one would serve; and it might be better and bigger than either one, and still leave money for other purposes. The same thing would be true of equipment for instruction in other branches of engineering. Throughout the whole field of technical instruction there would be concentration of resources and conservation of energy in a degree approaching the theoretical.

But there are arguments against the idea. Most powerful is the unwillingness of Technology to give up her separate entity. It may as well be recognized at the start that this obstacle will prove well-nigh insuperable to any plan for the absorption of Technology by Harvard. The Institute is to-day the foremost engineering school in the world. It has won its way to the top by hard work and keen foresight, and it is too proud of its fair name to relinquish

its individuality. But this argument holds only against union. Alliance seems feasible ; and what advantage of union would be lost ?

On January 25 the Boston *Daily Advertiser* published interviews with members of the Corporation of the Institute, preceded by the following statement :—

(1) On the Executive Committee of Massachusetts Institute of Technology, Harvard to have 3 men and 5 men on the Corporation, or such other minority representation as may be mutually agreeable.

(2) Technology to have sole control of all its property and everything else relating to its affairs, but to have a share in the funds at Harvard's disposal.

(3) Technology to remain an independent corporation in all matters of legal official action.

(4) Technology to retain its legal corporate existence, title, etc., without change, as a Boston institution.

(5) Technology students to have such athletic and other privileges at Cambridge as Harvard University students now have.

These are the terms that will be offered by Harvard to Tech, when the proposed conference takes place.

On the same day appeared the following editorial in the Boston *Evening Transcript* :—

The suggestion of a merger of the Massachusetts Institute of Technology and Harvard University, which appears to have had its starting-point in one of Mr. Carnegie's schemes, is not likely to be realized, if it depends upon the friends of the two institutions. The alumni and Faculty of the former are particularly opposed to such a union ; and Tech would be likely to lose much of its splendid teaching talent, should it go into effect. These two great institutions stand for different things, and their prosperity and usefulness can be advanced more surely by working along their present and separate lines than by any attempt to fuse interests and efforts on a common working basis. The university certainly needs no defence in this matter. It can take care of itself ; and, should the Institute become a part of it, it would be Harvard University still. But the former has earned the right and the privilege to remain identified with its own splendid history and phenomenal success. From small beginnings it has come up through struggle and devotion and wise direction, until it is now known at home and abroad as the greatest technical school in the world ; and to rob it of its individuality would be a poor recognition of the great service it has

rendered the educational and industrial interests of the United States. The thousands of alumni who are occupying places of responsibility and distinction all over the world can hardly take kindly to the idea of exchanging a mother for a step-mother, however benignant and distinguished the latter may be ; while she, in turn, has no occasion to desire an increase in her family, except in the natural course of events.

On the following day appeared a second statement in the columns of the *Transcript* as follows : —

A HARVARD-TECH ALLIANCE

Revival of talk in the last few days about the desirability of an association of the Massachusetts Institute of Technology and Harvard University in the teaching of applied science has been followed with interest by partisans of both institutions, and the more there is said about it the more it becomes apparent that some sort of association is bound to come, and before very long. The only question is one of details. Neither institution means to sacrifice much in order to bring the thing about. Probably no great sacrifice would be involved ; but it is evident that Technology wishes to enter into an agreement, if at all, without losing her identity as a school, while Harvard appears to favor an alliance only when there shall be insured to her what she considers a proper voice in the control of funds and courses relating to instruction in science.

No weakness in either institution is responsible for the talk of a combination. The Institute of Technology has a larger number of students than ever before, and resources to correspond. The Lawrence Scientific School, the only division at Harvard that would be affected, was never so prosperous as it is to-day. Ten years ago the Lawrence School was a division of the university that attracted comparatively little notice. It had a small registration of students, and among the student body, at least, it was notoriously easy of entrance, so much so, in fact, that candidates for admission to the college, who failed to reach the requisite mark in their entrance examinations, often qualified for the Lawrence Scien-

tific School for the first year or two, and made up work enough to enable them to join their classes in college as "regular" students before the completion of their course. Five or six years ago the authorities began to give much closer attention to the Lawrence School. Requirements for admission became more exacting, new courses were added, and the facilities offered were such as to be attractive to men seeking a high grade of technical training. As a result, the registration each year, in the face of the stiffening of admission requirements, has steadily increased. Where there were hardly more than two hundred students eight or ten years ago, there are now nearly six hundred. Last fall was the first in recent years when the registration did not show an increase over those of previous openings; but it is to be remarked that this was the first year in the history of the school when the admission requirements were on exactly the same basis as those for the college itself, and also that in the year before a presidential election there is often, as in this year, a general falling off in registration for colleges all over the country.

Since an association of Harvard and the Institute of Technology was discussed six years ago, and negotiations were for the time abandoned, the idea of some kind of coöperation in science instruction has not by any means been lost sight of. Professor Shaler, dean of the Lawrence Scientific School, has always been in favor of bringing an arrangement to pass; and it was largely through his influence that a good object-lesson was afforded last year of the way in which the two institutions could work together, when Professor Shaler himself and Professor Jaggard gave courses in geology at Tech and Professor Hoffman of the Institute of Technology gave instruction in the sister institution during the absence of Professor Smyth. That was not the first instance, either; for three or four years ago Professor Woods of Tech came out to Harvard to give a course in mathematics. Professor Shaler is not at hand to interest himself specially in the revived discussion of an association; for he sailed January 2 for Egypt, and landed there January 20, intending not to return until next June.

Harvard sentiment, so far as it can be gained from a talk with

officers of the university having intimate relations with the Lawrence Scientific School, would admit of an association or plan of coöperation in the teaching of applied science that might not amount to union. The Institute of Technology would not go so far as union. As for any arrangement that might be made looking to a mere alliance, its form is not definite even in suggestion. But it has been said that one way in which coöperation might be effected would be by making the Lawrence Scientific School a graduate school for science students, to take the graduate students of both Tech and Harvard, while the Institute of Technology should be the undergraduate school and take the undergraduates for both. Or it has been stated that, if desired, the students of the Lawrence School might be turned over to Tech without any arrangement for a graduate school at Cambridge, thus practically doing away with the Lawrence Scientific School as a separate identity, and turning its resources to enrich the list of lectures to be available under the coöperative arrangement.

These plans are of interest only as suggestions showing something of the trend of thought on the matter. But it is a fact that the funds under which the Lawrence Scientific School was established are absolutely without any restriction which would interfere with the merging of the school with another institution or the complete abandonment of the name which the school has borne since 1847. The school was instituted by the Corporation and Overseers in that year. It took its name in recognition of a gift of \$50,000 from Hon. Abbott Lawrence of Boston, and was opened to students in February, 1848. It was at first announced as an advanced school in science and literature, for graduates and other sufficiently qualified persons of not less than eighteen years of age and was therefore in its origin a forerunner of the present Graduate School of the university. Most of its early students were college graduates or men of mature age who went there for the professional study of a special subject. The instruction originally proposed in literature, however, was never organized; and the school came to be one for training in the various branches of natural and applied science. It gives the degree of bachelor of science.

The only reason in evidence so far to occasion the revival of previous suggestions for an association of this school and the Institute of Technology is the prospective removal of the Institute to a new site, where new buildings and more room would possibly give greatly increased facilities. It is held that, if the association is to be effected, it should be brought about before Tech moves.

On January 27 the *Transcript* published a leader upon the subject, as follows :—

NOT MERGER, BUT RECIPROCITY

The welfare, not simply of Boston and of Massachusetts, but of the entire country, is so bound up with that of Harvard University and the Institute of Technology that any step affecting the future of either of those institutions is of deepest interest. Boston, however, has an especial stake in the affairs of Technology; for it is peculiarly a creation of her merchants and manufacturers, and its presence here adds in no small degree to the city's reputation. A proposition for a "union" or "alliance," such as is advocated in certain quarters, is a matter, therefore, for thoughtful consideration by all citizens. This revival of what is not a new proposition has been induced by the recent McKay bequest of several millions of dollars to the Lawrence Scientific School of Harvard University. It is contended that there is waste of money and effort in having parallel courses in engineering in the two institutions; but this duplication, so far as appears from a study of the histories of the two institutions, has been brought about largely by the establishing at Harvard, in more recent years, of courses which were already well developed at the Institute.

With colleges such as these, however, which draw their students from all over the country, this duplication does not appear to be of very serious consequence. It is true that the institutions are within a mile or two of one another, but that is because each has settled in the environment most favorable to its development. And, since there will always be many young men who prefer to get an education in applied science in an institution which has developed under

modern conditions and upon foundations of science, while there will be many others who prefer to get a similar training in the atmosphere of a more diversified and fundamentally classical university, it would seem that there might always be patronage enough for both institutions, situated though they be side by side and offering courses similar in name. For, as long as they are kept separate, they will develop those courses along lines which, because of unlike traditions and divergent conceptions of education, must always continue to be different and to appeal to different species, if one may so express it, of young men.

Even were there real waste in this parallelism of the two colleges, it seems to us far better for this to continue than for the new development in higher education, of which the Institute is the type, and in which it has been the leader, to be arrested or curtailed by any "merger" with Harvard, which leads, and we hope always will lead, in the forms of higher education brought from the mother country. Ever since the Institute was established there has been an effort, fluctuating in intensity, to unite the two institutions; and, without exception, it has been strenuously opposed by those who have best understood the educational situation in America. President Rogers, who projected the Institute of Technology so clearly and sanely that his main lines of development have been scarcely departed from, was determined against any union with the older college; President Runkle, who piloted the Institute through the dark days following the panic of 1873, sacrificed his health in the struggle to keep the Institute alive on an independent basis; in 1878, when the affairs of the Institute were at their very lowest ebb, the Faculty of that day accepted a reduction in their salaries, the then treasurer of the Institute, John Cummings, pledged his personal credit for large sums, and Dr. Rogers reassumed the too heavy burden of the presidency, rather than accept a proposition for consolidation made by the Cambridge university. Throughout the whole fifteen years of his presidency, General Walker was outspoken in his condemnation of any surrender of the Institute's autonomy.

It is not conceivable that these large-minded men were opposed to union with Harvard because of mere obstinacy or personal pride.

They opposed it because they looked upon the Institute not simply as a school of applied science, but as the leader in a new development of higher education. For centuries college life has been modelled on the cloistral, monastic conception of scholarship: the Institute proposed to prove that learning might be based just as truly upon industrialism. To the classical college, culture means leisurely absorption of the past: the Institute proposed to evolve a new culture out of strenuous dealing with problems of the present and the future. Holding firmly to these lines during the forty years of its existence, the Institute has not only made a high reputation, but has profoundly affected all modern education. In the life of a college, however, forty years is nothing; and it is only to-day that the Institute has been able to pause for a moment in its struggle with undergraduate problems, and to take steps towards the full fruition of its original plan. To join itself with Harvard, then, at this juncture would be to arrest not only its own development, but that of modern higher education, and to crystallize the Institute of Technology for all time into a mere professional school. For this reason Harvard should be as unwilling as the Institute to merge the two colleges, for the cause of higher education which both are striving to promote would be given a stunning blow.

It would be as great a calamity for Harvard to wrench herself out of her line of evolution in order to adopt that of the Institute as it would be for the Institute to give up her type of growth for that of the older university. Each has its peculiar and needed work to do; and the community cannot permit that either should give up that work, especially as a further blow to the future of higher education in the United States would be struck through curtailing the number of teachers (for to diminish the number of good professors is to impoverish the country) and through the sacrifice of the interest and loyalty of the great body of Institute alumni who have made the reputation of Technology what it is.

To us this plan of union is not only pernicious, it is wholly unnecessary. Every disadvantage due to the duplication of educational work by two institutions within a mile of one another can be overcome by a friendly agreement, through which certain stu-

dents of the one, under easily established regulations, may attend certain courses in the other, through which the laboratories of the Institute and the museums of Harvard may each be placed at the disposal of the other. Such reciprocity as this would vastly increase the usefulness of both colleges; but for either to give up in the slightest degree its autonomy, for either to admit to its governing body or to the councils of its faculty representatives of the other having voting power would result inevitably in converting the two greatest American leaders in education into an inferior, half-breed institution, into a university of compromise. Each is now developing along wholesomely divergent lines; each is now meeting, separately, the needs of widely different minds; each is now supplying the country with two kinds of urgently needed men. Under these circumstances, for Harvard and the Institute to unite would diminish the educational power and prestige of Massachusetts, and would deprive education of the exemplary benefits and commerce of the practical benefits of their healthy, friendly competition. And from such union there could hardly fail to result a sort of Siamese twin, the educational functions of both unfortunate members of which would be affected by the ills of the other, the freedom and growth of each member of which would be fatally hampered by the bond binding him to his equally trammelled brother.

The *Advertiser* of the following day contained the following editorial: —

TECH AND BOSTON

Nobody who knows much about the Institute of Technology would ever consider the idea of its being anything but a Boston institution. It can be, and some day will be, affiliated with Harvard University; but its site will always be in Boston, its work will be done here, its dormitories and branch shops will be in this city. Its arrangement to work with Harvard under some legal bond that will permit it to share in Harvard endowments and to be in complete harmony with the Lawrence Scientific School across the Charles will not take the Institute out of its Boston field.

A report was started in Boston this week that President Pritchett had decided to move the Institute to the Cambridge water front, as a means of amalgamating with Harvard. President Pritchett would be the last man in the world to do that. The suggestion was made to him long ago, and he investigated the site. He found that the sentiment in Cambridge is dead against having any more of the now taxable property handed over to enterprises that will not pay taxes. He also found that the strongest sentiment exists that, however close the relations between the Institute of Technology and Harvard, the former will best work with the latter by keeping its distinctively Boston character.

There was a proposition, some time ago, to secure this Cambridge water front for the Harvard Medical School. But the sentiment against taking any more Cambridge property off the tax list had its effect. And, even more, the Brigham hospital appropriation would have been out of reach if the Medical School had left Boston. The situation is very different on the Boston side of the river front. A great educational institution out in that general section, like the New England Conservatory or Simmons College near the Fenway, helps to improve the surrounding property. If Tech goes out that way, the more valuable property on Boylston street goes on the tax list, and land out on the flats will be made more desirable for purchase by others. The plans for the Charles River dam will make a great park of that hitherto rather neglected part of Boston; and, naturally, that is the reason why Tech's Corporation, made up largely of well-posted men of affairs, have been looking in that direction.

The steps already taken towards future closer relations between Tech and Harvard University have had nothing in common with any move of the Boston institution to Cambridge. The very men who favor the former proposition, with hardly an exception, oppose the latter. The very thing that is wanted by either side, outside of some legal connection between the two (so that Harvard in upbuilding Tech shall be upbuilding the university), is that every weight of the prestige of the name and Boston location of the Massachusetts Institute of Technology shall be preserved as a part of its special individuality forever.

The matter then disappeared from the columns of the press until the Sunday *Herald* of February 14, which commented upon the editorials of the January issue of the REVIEW in the following flattering terms: —

THE INSTITUTE OF TECHNOLOGY

No other college periodical that comes to our table has the freshness, readableness, and fine flavor of earnestness of the TECHNOLOGY REVIEW. Primarily, of course, the REVIEW is an arena for exploitation of the ideal of the Institute of Technology, dissemination of information about it, and the cultivation of loyalty; but this purpose is pursued so broadly and generously that the publication has become not only interesting, but important to the educational world generally, and especially to all who are concerned with the development of that motive and mode of education which the Institute exists to exemplify. The value of its contents is high, and the tone throughout is lofty and generous.

Such a periodical must be of large service to the Institute as an indication of the quality of the men whom it sends into the world. If any one supposes that a school of science and technology is unlikely to develop good writers, this publication will correct his error. It yields precedence to no other of its class in the literary vitality of its pages, regarded as a whole. Some of the articles, especially those which appear under the caption "Editorial," have a happy felicity of expression, adorning, but not disguising, a substance of robust, definite thought.

In the number dated January, only just received, the editorial writer discourses in a noble and discriminating style of things suggested by the centennial of the birth of the organizer and first president of the Institute, William Barton Rogers. The character of the man, the long incubation of the project of such a school of science, the scope of his definite ideal, his patience, ardor, and unswerving devotion, and the wonderful growth of this pioneer in its class are deftly suggested in admirable form. The tribute is completed by a just exposition of the controlling spirit of earnest-

ness in work, of which he was the fine example, — a spirit which has continued to be controlling to the present day, and has always been an especially distinctive trait of the men educated at Tech.

All this leads up to a definite, practical conclusion that is significant, in view of all the talk that has been in the air and is still kept afloat, by occasional reports of one kind and another that obtain currency in the newspapers, regarding a contemplated merger of the Institute of Technology and Harvard University. The idea of President Rogers was that the Institute of Technology should steadily develop on its own lines into a great, independent university. The writer of whom we have been speaking indicates how this large hope is slowly, but surely, advancing to fulfilment. He recognizes the prestige which the Institute has accumulated by its preserved and diligently prosecuted fidelity to its birthright of a new order of education, and the immense value to its recent graduates of their unique heritage of past accomplishment. Then follows this sagacious and positive declaration: "Like the national credit, however, this prestige may be easily destroyed. It cannot be upheld except by adherence to the highest ideals, it cannot long maintain itself unless the college is developing and aspiring, it cannot survive by one hour the downfall of the college itself."

This utterance we interpret as significant of the profound conviction of those who best understand what the Institute of Technology stands for in the educational system of the country, and are bound to it by love and conviction, the conviction of which love and reasonable appreciation are the basis, to maintain undimmed this established beacon light on the shore of the new and yet only partly explored continent of modern education.

This was followed by a second editorial on February 23: —

ARMOUR SCHOOL OF TECHNOLOGY

There has been an agitation, or, at any rate, a scheme, for uniting the Armour School of Technology in Chicago with Chicago University in some manner not yet clearly defined. Chicago University is an outreaching institution, and harbors large designs in the

way of "co-operating" and "affiliated" colleges and schools that include an extensive part of the North-west. The purpose in respect of the Armour School of Technology appears to resemble that which has been broached here regarding a merging of the Massachusetts Institute of Technology in Harvard University. But all plans of that kind have been definitely checked. Mr. J. Ogden Armour has lately made a very large gift to the school founded by his father. The gift will greatly enlarge the facilities of the school and the plant, provision being made for extending its grounds and for costly improvements. It is declared that this gift, confirming the independence of the school on its present site, "makes it clear that neither the widow nor the son of Philip D. Armour has ever seriously entertained the idea of surrendering absolute control of it to Chicago University." The *Inter-Ocean* says that "Chicago is to be congratulated on the evident purpose of the Armour family and President Gunsaulus to preserve its independence." Does not this example point the way by which the friends of the Massachusetts Institute of Technology may assure its independence?

In the Boston *Traveler* of Jan. 29, 1904 the following comment appeared:—

If the Institute of Technology wants to combine with Harvard, we do not know as we have any objections, but it is to be hoped that it will retain its own characteristics in the transfer, and not be completely eaten up by the Cambridge institution.

The *Harvard Graduates' Magazine* for March discusses the matter as follows:—

HARVARD AND THE INSTITUTE OF TECHNOLOGY

For the past month the Boston papers have been full of rumors in regard to a proposed alliance between Harvard University and the Massachusetts Institute of Technology. What has gained the report some credence is that twice during the past ten years Harvard has consulted with the Institute in regard to some such alliance, though with no results. Probably the immediate cause of the rumors is the prospective removal of the Institute to a site where

new buildings and more room will produce increased facilities. Naturally, any such alliance should be made before the Institute moves. . . . It certainly seems wasteful that two great institutions, so near together, should continue to duplicate each the work of the other; but it is questionable whether the chances for an alliance are as good as they were before the recent Gordon McKay bequest for the development of applied science. By this it is said that within a few years some \$4,000,000, and eventually other millions, will pass to the president and fellows of Harvard College to maintain professorships, workshops, laboratories, and collections for those scientific subjects which have, or may hereafter have, applications useful to man, and to aid meritorious and needy students to pursue these subjects. Mr. McKay drew his will with such generous and careful thought for those who shall in the future belong to the scientific part of the Harvard faculty that it is but human that those who are at present teaching science at Harvard should wish to see the conditions of the will fulfilled in Cambridge.

Finally the *Tech* for March 24 contains the following editorial: —

The *Tech* has carefully refrained from any discussion of the newspaper proposition to unite Harvard University and the Massachusetts Institute of Technology. The idea seems to be one of those irised delusions which periodically present themselves to the enraptured eyes of the newspaper man on space rates. Whatever may be the merits of this proposition, it is quite evident that the undergraduate bodies of both institutions have very decided opinions on the subject, and those not favorable.

It is but natural that we of Technology should view with alarm a scheme, or a rumor of a scheme, which threatens the very existence of our institution, and should raise our voices in indignant protest; yet let us not forget in our indignation that in our hands lies the fair name and fame of Technology, peerless among the schools of the world. It is rare sport to throw off with one hand a little song in which most of the words rhyme with "slam" or "yell," but, after all, it is not such a convincing argument, nor does it

make up in manliness what it lacks in polish. If the day comes, which may Heaven forefend, when there is danger of Harvard absorbing, assimilating, or applying what merging process you will, to Technology, then let every true Tech man send his dignified protest to the Corporation. Meanwhile it should be noted that it would be lack of endowment which would drive Technology to such a step. There is food for thought in this for every loyal graduate.

THE COURSE IN GENERAL STUDIES

Reference has been made in previous numbers of the REVIEW to the action of the Executive Committee of the Corporation and of the Faculty in regard to the proposed discontinuance of the Course in General Studies. The further steps taken by the Faculty are embodied in the following statement adopted by the Faculty Jan. 6, 1904:—

STATEMENT BY THE FACULTY TO THE CORPORATION IN REGARD
TO THE MAINTENANCE OF A GENERAL COURSE

The Faculty has been advised by the President that action has been taken by the Corporation looking to the discontinuance of the present course in general studies, at least in its present form, and requesting that the Faculty consider the substitution of a course in general science. This proposed substitute has been carefully considered by a special committee of the Faculty, which has reported that, independently of the proposed discontinuance of the present Course IX., it appears to be inexpedient, if not impracticable, to arrange a course in general science.

The report of this committee was accepted by the Faculty, and a second committee was appointed to consider and report on the question of maintaining a general course at the Institute. This committee has made a thorough and careful study of the subject, corresponding with members of the Faculty and with graduates, and has presented an extended report.* The remainder of the present

* The general tenor of this report is indicated by the following extracts:—

“With reference to the question of radically modifying the General Course, the topic which has naturally been most discussed by the committee relates to the establishment of a Course in Commerce. The committee believes that a strong and systematic course in commerce or in business methods, established at the Institute with proper means and force of instruction and supported with enthusiasm and well advertised, would be desirable and successful. . . .

“With reference to the question of modifying less radically the General Course, the committee has carefully considered the arguments which have been detailed, and it has reached the conclusion that, if a general course is to be retained, it is desirable to modify it so as to make it aim more directly in the direction of business management, administration, and finance. The

statement is based to a considerable extent on the results of this investigation.

After extended discussion of this second report the Faculty has expressed its opinion by the following vote :—

VOTE OF THE FACULTY

It is the sense of the Faculty that the present Course IX. should not be discontinued unless and until it can be replaced by some course which may be still better calculated to serve the following needs :—

(1) The maintenance and increase of appreciation of general studies on the part of the student body.

(2) The offering of such opportunities for specialization as may facilitate the engagement and retention of the strongest available teachers in general subjects.

(3) The maintenance of the Institute's position as upholding the principle of combining general with professional education.

(4) Such provision as may be thus practicable for the student who desires a general education under the conditions of a professional school and in association with professional students.

The Faculty respectfully presents to the Corporation the following reasons which have led it to this conclusion :—

THE STATUS OF GENERAL STUDIES FOR ALL STUDENTS

It is the established policy of the Institute to receive graduates of high schools and academies at the age of about eighteen, and with consequently limited general education. The Institute has therefore always reserved a portion of its curriculum for certain elements of general education not directly necessary for technical pur-

committee has been forced to the conclusion that, from the educational point of view merely even if no charge can be made in the course, it would be desirable for the interests of the school to retain it as it is ; but it would strongly urge that the endeavor be made to modify it, with the advice of the members of the Faculty from the Department of General Studies, and with regard to the means which the Corporation feel able to place at disposal for this purpose."

No action was taken by the Faculty on this recommendation.

poses, in particular English Composition and Literature, United States and European History, Political Economy and Industrial History, with the conviction that these studies are not merely of high intrinsic value, but that the application even of a very moderate amount of time to them tends to broaden the intellectual horizon of the students, and to counteract in some measure the narrowing tendency of specialized technical studies, if pursued exclusively. The importance of the non-scientific elements of general education has been recently recognized by the Faculty by the reservation for general studies of nearly half the time released in all departments by the advance of entrance requirements in modern languages.

It has always been a matter of great difficulty to secure due attention to general studies. The average Institute student has a strong leaning toward mechanical and scientific subjects, and but little natural aptitude for literary courses. The disposition of the professional student, which he more and more acquires during his four years, is unfavorable to breadth of interest. He will not derive due benefit from the literary courses unless they are skilfully presented by able specialists in the respective lines. It is significant, however, that many of the younger graduates are keenly conscious of the defects of their general education and of the opportunities of which they have not taken full advantage as students.

The graduates of the Institute have a high reputation for technical training and efficiency, and find immediate professional employment. Their advancement to positions of administrative responsibility, their status as citizens and as educated men, and the high reputation which the Institute owes to them will greatly depend on the breadth of the education which it has given them. Any lack of appreciation of this dependence will in the end operate to the disadvantage of the school.

THE RELATION OF THE GENERAL COURSE TO GENERAL STUDIES FOR ALL STUDENTS

The Faculty understands that the value of general studies in the education of students at large is not questioned, but the importance

of these studies has here been emphasized because of the conviction of the Faculty that the maintenance of a general course or its discontinuance will inevitably have much influence on the status of general studies for all students through its effect on the standard of teaching these subjects.

The maintenance of a general course implies the offering of specialized work in English, History, and Economics, and the grouping of these and other studies into a four-year programme leading to the degree. If the general course is discontinued, many of these specialized subjects will fall out, and the general subjects remaining will be taken only by students having little time or inclination for them. The occasional student with literary interests will have less opportunity for using any margin of time in these directions.

The discontinuance of the general course would render it increasingly difficult to secure and retain the services of teachers of the highest standing in general subjects for students in all departments. The conditions of teaching these subjects at the Institute are necessarily disadvantageous on account of the lack of active student interest. If the present opportunity for specialization along these lines were curtailed or removed, it seems evident that the work would become unattractive to young men of ambition, and that the present difficulty of maintaining a high standard of instruction in general subjects would be greatly enhanced.

It may be noted that, while the number of specialized subjects given wholly or mainly for students in Course IX. is considerable, this does not depend on the participation of a staff of instruction materially larger than is required for the general studies of all departments.

The discontinuance of the general course, which has been maintained in one form or another for nearly forty years, would be regarded by the students, the graduates, and the general public — rightly or wrongly — as evidence that the Institute intended in future to pay less attention to the general education of its students and to make its work more exclusively technical. This belief would tend to its own realization.

THE GENERAL COURSE

Passing from the consideration of the relations of the general course to the educational interests of the student body at large, the following considerations may be added in regard to the present course in general studies : —

A general course has been maintained from the foundation of the Institute, and it has been conducted with unquestionable efficiency.

The general course has been completed by a considerable body of graduates, whose subsequent records have been distinctly creditable to the course and to the Institute. These men are, almost without exception, opposed to the discontinuance of the course, and their loyal interest in its maintenance seems to the Faculty worthy of consideration and respect.

The general course makes adequate provision for those students who seek a general education under the conditions and environment of a professional school, and also for the better students among those who have made the mistake of undertaking an engineering course without the special aptitudes necessary for success in it. Excluding the idle and the incompetent altogether, there are in every class those for whom a transfer to such a course as we have heretofore maintained is a decided advantage, which may mean all the difference between success and failure. It is an advantage to the Institute to be able to offer these students work which they can do well as leading to its diploma. It is an advantage also to the Institute to include among its students a wide range of mental types, thus utilizing the mingling of students of different types as a valuable means of education.

The fact that students in Course IX. have not been numerous, while not deemed of great importance, is sufficiently explained — with no implication unfavorable to the course — by the facts that the Institute has never desired that the course should be taken by many students, that the Institute has made its reputation by its professional courses, which have completely overshadowed the general course, and that the latter, while not duplicating a college course, has had more in common with it.

The demand for general education is indeed indefinitely great, and the variety of boys requiring it is not less so. It is in the general interest that opportunities for such education should be as broad and as free as possible. The Institute is in a position to render a public service by offering a form of general education under exceptional conditions, with no impairment of its professional work or standards.

RECAPITULATION

To sum up the considerations above presented, the Faculty respectfully submits :

That the maintenance of the general courses represents continuity of educational policy dating from the foundation of the school ;

That a general course contributes materially to the completeness of the education of the students at large by rendering it possible to secure better teachers and by strengthening the position of general studies ;

That a general course offers an alternative for the college course preferable for some students, and at the same time meets the needs of those students whose aptitudes are not of the kind required for success in the professional courses, thus obviating the disappointment and hardship involved in making a fresh start elsewhere ;

That, on the other hand, its discontinuance would be attended with the probability of serious disadvantage to the status of general studies ;

That it would be repugnant to a body of loyal graduates ;

That it would inevitably carry to the public at large the implication that the Institute of Technology will hereafter take less interest in the breadth of general education of its students.

It is not the intention of this statement to imply that the present course cannot be improved. The Faculty is ready to make every needful effort to maintain and increase its value and efficiency.

This communication from the Faculty was considered by the Executive Committee and referred to the President for a report who submitted the fol-

lowing memorandum upon the question of general education as offered in the Institute.

A MEMORANDUM IN REGARD TO COURSE IX.

To estimate fully the efforts which have been made in the Institute of Technology to provide a general course of study suited to the needs of men entering various callings of active life, a short review of the courses offered seems necessary.

The plan of a general education as a part of the work of instruction in the Institute originated with President Rogers. In his statement of the "Objects of the School of the Institute" he outlined three divisions of its work. "(1) To provide a full course of scientific studies and practical exercises for students seeking to qualify themselves for the professions of mechanical engineer, civil engineer, and the like. (2) To furnish such a general education, founded upon the mathematical, physical, and natural sciences, English and other modern languages, and mental and political science, as should form a fitting preparation for any of the departments of active life. (3) To provide courses of evening instruction in these main branches of knowledge for persons of either sex who are prevented by occupation or other cause from devoting themselves to scientific study during the day."

This school, it must be remembered, was itself only a part of a general scheme of education which President Rogers planned,—a scheme most comprehensive in its scope, and which was intended to reach from the highest scientific development, as represented in the Society of Arts, to the most elementary needs, as represented in the evening school.

Of all this original and comprehensive scheme—the Society of Arts the Museum and the School of Industrial Science which together formed the Institute—the School of Applied Science has alone proved to fill a real want; and to-day it is this school which is called the Institute of Technology.

The first of the functions of the school which President Rogers contemplated has absorbed most of the strength and energy of

those who have directed it,—a result due, in the main, to the practical trend of the times and of our national development. The effort, nevertheless, to combine with the work of the technical school a course for general education, has never been given up. The following courses have been provided at the times indicated to meet this effort.

From the foundation of the Institute until 1871 the course was denominated "General Science and Literature." It consisted of certain required work in physics, geology, botany, philosophy, political economy, and modern languages, with a very free selection in other scientific studies and in the engineering courses. It offered, in the language of President Rogers, "a sound education based on the sciences and literature, and furnished with its wide range of elective studies a useful preparation for any of the departments of active life." The thought in President Rogers's mind evidently was that in the wide choice of subjects offered to students might be found an opportunity for an entirely different preparation and for an entirely different quality of mind than that which was suited to the prescribed courses in engineering subjects. It is interesting to note, however, that in this course geology, the science in which President Rogers was particularly interested, was a required study, not an elective one,—a small evidence of personal equation which has existed in all the efforts which have been made in the Institute to present a general course suited for "a useful preparation for any of the departments of active life."

Apparently there was very little response to this effort to provide a general education. In 1871-72 another course of a general sort was added in Natural History, intended for the training of those whose ulterior object was the pursuit of geology, botany, mineralogy, zoölogy, pharmacy, medicine, or rural economy; but this course was dropped after a single year. In 1873-74 two general courses were presented: first, a course in Science and Literature, such as had been maintained from the beginning; and, second, a course in Philosophy. This latter course, in the language of the catalogue of that day, was founded on the mathematical and philosophical sciences, and offered "a sound education as well as a suitable

preparation for any of the departments of active life." This course in Philosophy is one of the most unique, and in many respects one of the most curious, estimates of a course suited "for a preparation for any of the departments of active life."

Should the Institute ever be accused of too great a devotion to the practical and utilitarian or of a failure to attempt to deal with the transcendental, a good defence can be found by looking over the examination papers of the Department of Philosophy. For example, in the examination of May 29, 1875, the following was the examination paper:—

"Write a connected sketch of the history of philosophy from Descartes to Hume, inclusive, giving the system of Descartes, Spinoza, Leibnitz, Locke, Berkeley, and Hume. Be especially clear upon the following nine points." The nature of these points may be estimated from point number seven, which is, "In the case of Leibnitz give the conception of the monads, the gradations of existence, and the three principles of thought."

In 1875-76 the students in this course, from the testimony of the catalogue, had mastered Kant, and in their examination papers were dealing with such questions as, "Starting from the primary distinction between object and subject and matter and form, trace Kant's whole theory for the upbuilding of cognition."

I am not quoting these rather transcendental questions with any purpose of ridicule, but rather to show the various conceptions which have at one time or another existed in the Institute as to what kind of a general course is suited "for the preparation of men for any of the active departments of life." The course in Philosophy was under the charge of one of the most brilliant and inspiring men who has ever been connected with the Institute.

In 1877-78 the course in Philosophy was abandoned, probably on account of the departure of Professor Howison, and, in part, owing to the greater interest aroused by the introduction of Shopwork, by President Runkle. To take its place there was introduced what was called in the catalogue of 1878-79 "The Elective Course," and in subsequent catalogues "An Elective Course." It differed from the course in Science and Literature, which was still main-

tained, chiefly in the larger element of election given to students in scientific studies, and by the requirements of a smaller amount of literary and historical studies. These two courses were both maintained through the year 1880-81, but apparently attracted very few students. Probably as a result of this lack of interest in the course in Science and Literature and in the Elective Course they were amalgamated in the catalogue of 1881-82 under a general head as "General Courses A, B, and C." In the first, physics and mathematics predominated; in the second, chemistry, botany, and physiology; in the third, geology and biology, while certain attention was still given to languages, literature, and political science. These courses were especially commended to young men whose purpose was to become merchants, manufacturers, or bankers, or who desired to enter other business pursuits.

The offer of the Institute to deal with the work of general education was in this situation when President Walker came to the Institute. He urged, in his annual report of 1883, an extension "of the usefulness of the school, namely, through giving unity and vitality to the courses now known in the catalogue as General Courses A, B, and C, which have for their special object the preparation of young men for active business life, through studies which are of a predominantly scientific character, yet not directed toward any one of the distinctly scientific professions. Almost from the opening of the school, courses have been arranged with reference to this object; but the exacting demands made by the engineering and other technical departments upon the very limited resources of the Institute have, in the past, prevented instructors from giving to these courses the degree of time and effort necessary to secure their proper development. Moreover, as the primary object of the Institute has been known to be technical education, it has not been found easy to attract the required degree of attention to the projected branches of study, on the part of pupils or their parents."

President Walker's reorganization of the course looked toward the devotion of a far larger effort in the direction of history, political economy, and business law; and he adds that with these more definite arrangements he "cannot doubt that the opportunities thus

offered for an education which shall combine both practical and liberal tendencies will be made use of in a rapidly increasing degree." The general course as thus reorganized became Course IX., under the term General Studies in 1887-88. The nature of the change is indicated by an inspection of the studies offered in 1884-85 and in those of 1894-95, at the beginning of the second year.

1884-85

Physics

Modern History

French and German

Analytical Geometry

Theoretical Chemistry or

Advanced Algebra and Trigonometry

1894-95

Physics

Political History of England and
United States

French and German

General Biology

Political Economy

Economic Problems

English Literature

The third and fourth years also contained strong courses in social science, comparative politics, taxation, and similar studies. The nature of this change is indicated in the language of the catalogue itself, for the course as reorganized is recommended, not only for the needs of those expecting to engage in trade, banking, or manufacture, but to those who are looking toward journalism or "to the teaching of social or political science." In my judgment it is to be regretted that the course was not called a course in economics or in political science, since it would have, under this name, appealed more directly to those who were seeking such work than under the somewhat misleading title of General Studies. With minor changes Course IX. has remained as General Walker left it.

The general courses which the Institute has presented since its foundation have therefore been the following: —

(1) A "Course in General Science and Literature," with considerable choice of subjects, from 1866 to 1881. There were twelve graduates from this course.

(2) A "Course in Philosophy," from 1873 to 1879, in which course there was very little opportunity of election. From this course there were two graduates.

(3) An "Elective Course," from 1878 to 1881, from which there were two graduates.

(4) "General Courses A, B, and C," from 1881 to 1887. These involved a limited number of elective studies. From these there were seven graduates, including those who graduated as late as 1889.

(5) "General Studies," as now conducted, is largely a course in economics, from which there have been sixty-five graduates since 1889, of whom about one-half are in business, and about one-seventh are teachers. Five are bankers and brokers, six are lawyers, and three are in engineering practice. Meantime, however, a far larger number of men have passed through the engineering departments into business and professional life than have passed through Course IX. For example, Professor Ripley, formerly of the Institute and now of Harvard University, and certainly one of the strongest men who have been connected with Course IX., was a graduate, not of that course, but of Course I., Civil Engineering.

The result of this examination of the efforts made on the initiative of President Rogers to offer in a technical school courses leading to business life shows, first of all, the very interesting variety of conceptions as to what such a course ought to be,—conceptions which have in almost every case been tinged by the individuality of those who have composed the course. In President Rogers's plan the course was largely elective, but included considerable required work in geology and natural history. In Professor Howison's plan speculative philosophy formed the principal basis of study, while in President Walker's plan the course became practically a course in political economy. Two results seem evident from this examination: one, that there are few, if any, specifics for the general preparation of men for business life; the other, that, on the whole, the offer of the technical school to furnish general instruction has not been accepted by the public, whether the instruction has been offered under the form of an elective course or under that of a rigid required course.

This second result is quite in accordance with that which is

found elsewhere, and, as it seems to me, rests primarily on the fact that a general course in science appeals to a very limited number of men. This experience is quite in accordance with that which is found in other countries. In the winter semester of 1902-03 the regular attendance of students at the Berlin Technical School was as follows:—

Architecture	486
Civil Engineering	665
Mechanical Engineering	1,616
Naval Architecture and Marine Engineering	355
Chemistry and Metallurgy	335
General Science	6

In other words, the function of the technical school in our country, as in other countries, is to prepare men for certain definite professions; and this work does not lend itself readily to amalgamation with the work of general education.

Of the various general courses which have been offered the present Course IX. has attracted a far larger number of students than any other, partly because it has aimed at a more definite end, partly because of better organization, and of the service of able men; but it has fallen far short of President Walker's hope that it would "be made use of in a rapidly increasing degree."

In the memorandum presented to the Executive Committee by the Faculty two main reasons are advanced for retaining Course IX. in its present form. The first of these is that the maintenance of this course has an important value in increasing the respect for general studies amongst the student body. The second is that the advanced work in certain subjects of the general course makes possible the retention of strong men, who otherwise would be unwilling to remain in the work of the Institute. I have given careful thought to these reasons, and am compelled to say that they do not seem to me justified by such an examination of the facts as I have been able to make and by such knowledge of the student body as I have gained. The spirit of the student body of the Institute is pre-eminently that of a technical school. With the exception of the small group of men in Course IX., our students come to pursue studies leading to a definite profession. The presence in this great

group of students of a few men pursuing studies, which are not intended to lead to a specific calling, has no appreciable effect on the attitude of mind of the general student body.

The effective way, and in my judgment the only way, of creating in the minds of these technical students a respect for culture studies is to give such studies a dignified place in their own work, and then insist on as careful work in these subjects as in those of a professional nature. The good use of English, for example, ought to be considered quite as much a part of the equipment of the engineer as of any other educated man.

The experience of colleges which offer no advanced work in many of the subjects pursued in Course IX. would seem to negative the second of the reasons offered. In addition to this it ought to be possible to offer, in the time set free by the requirement of elementary German and elementary French, advanced elective courses in economics which should attract at least a limited number of ambitious students, particularly if a greater opportunity of election were given in the engineering courses.

In one way the abandonment of Course IX. might be considered as a change of attitude toward general studies; that is to say, by the interpretation put upon it by the public. Just what reputation the Institute of Technology enjoys above other technical schools as the representative of a more generous education, I do not know. In any change in Course IX. it would be wise to make clear to the public that this action did not involve any change of attitude toward the pursuit of general studies by engineering students.

There are two reasons, however, which ought to make an executive body to whom is intrusted the general policy of an institution hesitate to abandon such a course. One is that it is always a serious matter for an institution of learning to give up a branch of its work which has been well conducted; and Course IX., as it has been developed since President Walker's reorganization of the course, has been without question a strong course, efficiently conducted by able men. The instruction given in the course has been a credit to the Institute, and amongst its graduates are men whose work is also a credit to the institution. It is always a serious

matter to surrender a valuable piece of work once begun, whether it be germane to the main purpose of the Institute or not.

A second reason is the feeling of the body of alumni who have graduated in this course, and whose affection would in some measure be lessened by the abolishment of the course from which they graduated. Devotion to education in our country means, oftentimes, devotion to a single institution, sometimes even devotion to a section of an institution; and, while this form of partisanship is to be avoided, nevertheless no institution could wish to wound the affection of any part of its graduates.

Notwithstanding these two objections, however, my judgment is that the experiments of forty years have shown conclusively that the real work of the School of Technology is the preparation of men for definite professions, and that the work of general education lies elsewhere. At the time when President Rogers inaugurated a course of general education founded upon scientific studies there were no opportunities to obtain such education elsewhere; but even under these conditions the opportunity offered by the Institute was not accepted by the public. Since President Rogers' day conditions have changed enormously, and an education founded upon scientific studies, with almost any degree of election, may be obtained at numerous institutions. The Institute of Technology is to meet, in the next ten or twenty years, an increasingly sharp competition. It seems to me wise to bend its energies and to use its resources in the development of those departments of applied science whose existence and development form the real reason for the Institute's growth and for its existence.

At the same time I do not see why the original idea of President Rogers may not be carried out. There is no reason why we may not offer to the few who may care to come for special preparation the opportunity for elective work, after the first year, in the general and professional studies given in the Institute. Such a general course would cost the Institute nothing. It would never attract many students, but, on the other hand, would still leave in an institution whose courses are founded upon fixed curricula an opportunity for the occasional man to develop along other lines.

For example. A class of men is beginning to be formed in this country which looks toward the profession of teacher of science in the public schools. These men must necessarily teach not one science, but several; and in many instances they would like to combine with their course in science some work in applied science and in subjects like shop-work. To such a man a course in the Institute of Technology, elective after the first year, would provide exactly the opportunity desired; and an inspection of the courses offered will show that it is entirely feasible to select such a course from the work given to our regular students.

I do not think that such a course is likely to appeal to others than those who wish to become teachers or investigators; but I consider it to be a good thing for the Institute to have a larger representation in the secondary schools than it now has. This representation it will never get through its graduates from the professional departments, for these men, almost without exception, go into practice, or, if they become teachers at all, they become professors in the higher institutions. Such a course, with a small amount of required work and a large opportunity of election might, in my judgment, well be preserved as a general course, and fulfil President Rogers's conception of the characteristics of such a course, although it would not appeal to the large number of students which he expected to reach. It would result in a certain contribution on the part of the Institute to the teaching force of the country,—a result of value both to the cause of education and to the Institute. It would meet the wishes of alumni by preserving, in a different form, a general course; and, lastly, it would exist without imposing expense upon the resources of the institution, which need to be devoted in the most effective way to the strengthening of the work for which the Institute pre-eminently stands.

HENRY S. PRITCHETT.

GENERAL INSTITUTE NEWS

THE CORPORATION

The three hundred and first meeting of the Corporation was held at the Institute, March 9, 1904. Reports were presented by Visiting Committees for the Departments of Civil Engineering, Electrical Engineering, Chemistry and Chemical Engineering, Modern Languages, and Mathematics. Announcement was made of the legacy of \$2,000 from the mother of the late Richard Lee Russell, '89, for the award of an annual prize to the graduate in Civil Engineering having the highest standing.

GENERAL ALFRED P. ROCKWELL

The following memorial of the late Professor Alfred P. Rockwell has been adopted by the Faculty : —

The death of Alfred Perkins Rockwell removes one more of the few remaining men who, just entering upon a scientific career, dropped all personal aims at the first call of his country. Fortunately, General Rockwell was able to re-enter his chosen profession as professor of mining at the Sheffield Scientific School, where he had been graduated in 1857. In 1868 he was called to the same chair at the Massachusetts Institute of Technology, where he contributed not a little to the success of that department.

Instruction in mining in this country was at that time largely descriptive, by lectures, since laboratory methods were not then developed ; and General Rockwell's administrative ability was soon more fully utilized as chief of the fire department of the city of Boston after the great fire of 1872, and subsequently as president of the Eastern Railroad Company.

To those civic duties he brought the same high standard of duty, the same loyalty to the right, the same power of organization, which brought him during three years of the Civil War from a volunteer second lieutenant to brevet brigadier-general. Good judgment in placing his forces and courage in leading them to success characterized his services in these positions. While only a captain, he was commended by three generals on three occasions within a year.

The Massachusetts Commandery of the Military Order of the Loyal Legion showed its regard for the man and its appreciation of his services by electing him to its council in 1870 and in 1871, as its senior vice-commander in 1877, and as its commander in 1878.

His paper on the "Operations against Charleston, 1860," contributed to the Military Historical Society of Massachusetts, and his careful and scholarly editing of Volumes III. and IV. of its Memoirs, bear witness to the use he made of the greater leisure of later years.

General Rockwell was a member not only of this society, but of the Geological Society of France, the American Academy of Arts and Sciences, the Boston Natural History Society, the American Association for the Advancement of Science, and of various social clubs in Boston.

His relations with his fellow-men were marked by a dignity of manner and a self-respecting modesty. His cheerful disposition made him a welcome member of the various societies to which he belonged.

SUMMER COURSES

The following summer courses will be offered for the present year:—

Mathematics: (a) Analytic Geometry; (b) Integral Calculus; (c) Differential Equations. Applied Mechanics. Mechanical Drawing and Descriptive Geometry. Mechanic Arts: (a) Woodwork; (b) Forging; (c) Chipping and Filing; (d) Machine-tool Work. Modern Languages: (a) French I.; (b) French II.; (c) Advanced French for Teachers; (d) German I.; (e) German II.; (f) Advanced German for Teachers. Chemistry: (a) Inorganic and Analytical Chemistry; (b) Organic Analysis and Preparations; (c) Air, Water, and Food Analysis; (d) Advanced Inorganic Chemistry. Physics: (a) Mechanics, Light, and Electricity; (b) Heat; (c) Physical Laboratory; (d) Electro-chemistry. Civil Engineering. Surveying. Mechanical Engineering: (a) Mechanism; (b) Mechanical Engineering Drawing. Architecture: (a) Shades and Shadows; (b) Elementary Design. Biology: (a) Sanitary Bacteriology; (b) Research in Bacteriology and Public Health. Geology: (a) Mineralogy; (b) Topographic Geology; (c) Applied Geology; (d) Field-work in Geology.

Persons desiring instruction on other subjects may make application to the Secretary of the Faculty.

Summer courses this year will, in general, begin June 20, about ten days later than heretofore. Several advantages will result from this change. Students will have received their reports

of standing, and will be able to determine their plans for summer work more intelligently through consultation with parents or members of the Faculty. Admission to courses and registration can be much better regulated. Students from other colleges desiring admission with advanced standing will not be barred from attendance, as has heretofore been to some extent the case. The course in Physical Laboratory and Mechanic Arts will, however, begin June 15.

SUMMER SCHOOL OF MINING

A novel experiment in mining education is to be tried this summer under the joint direction of the School of Mines of Columbia University, the mining departments of the Massachusetts Institute of Technology, and the Lawrence and Sheffield Scientific Schools. It is proposed that the Senior mining students of the four institutions, and possibly those of the Colorado State School of Mines also, shall hold a joint summer session for the study of practical mining and mine engineering in Colorado. The students will go into camp at a mine to be leased, a small force of skilled miners will be employed as instructors, and the students will engage in actual mining operations, sinking shafts, driving levels, timbering, and similar practical work, and will make underground surveys, take samples from the ore bodies, make assay plans, and undertake other engineering work.

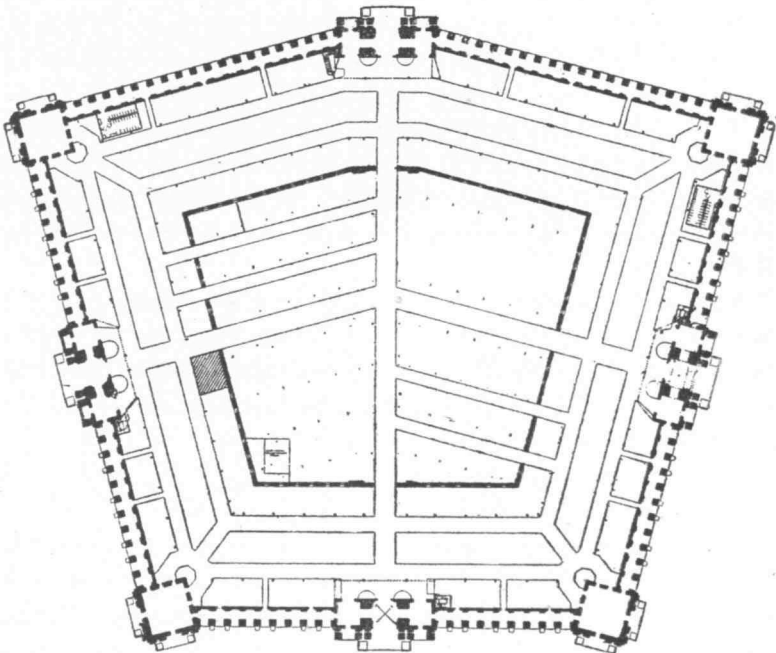
The conduct of the Summer School is to be in the hands of an executive committee, consisting of Professor John Hays Hammond, Yale; Professor Robert H. Richards, of the Institute; Professor Henry L. Smyth, of Harvard; and Professor Henry S. Munroe, of Columbia. Professor Munroe has been appointed director for the first year.

Summer schools of this character have for the last twenty or twenty-five years formed an important part of the regular work at the leading mining schools in this country. These summer sessions have been held in turn in different mining districts at different mines, where the students have been received by the courtesy of the mine's management.

The plan to lease and operate a mine will increase greatly the cost of the Summer School. It is believed, however, that the gain in efficiency will fully warrant the increased expense. Mr. George Crocker, of New York, through Professor John Hays Hammond, has offered to pay the cost of the school this summer, and has given \$12,000 for this purpose.

EXHIBIT AT ST. LOUIS

On April 30, 1904, the World's Fair at St. Louis will be formally opened. The Institute of Technology has secured a floor space



INSTALLATION PLAN FOR EDUCATION BUILDING.

Institute Exhibit will occupy shaded space

of one thousand square feet on one of the main aisles of the Education Building, and on this a booth has been erected with walls to the height of fifteen feet. The façade on the main aisle was designed by the Architectural Department, and is in itself an exhibition

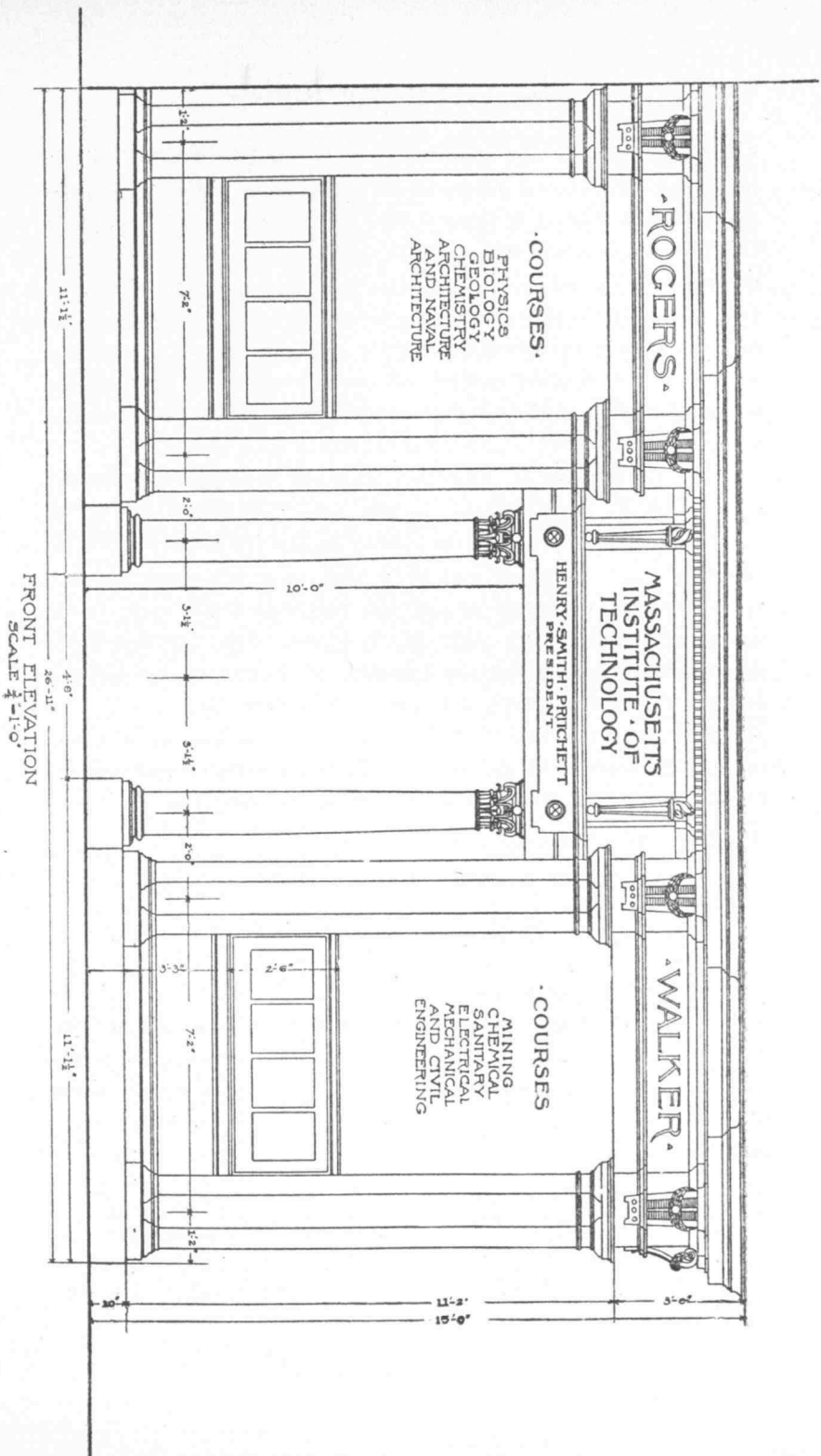
of the good taste of the department. The exhibit consists of drawings from the Departments of Architecture, Naval Architecture, and Civil and Mechanical Engineering, collections of photographs in albums illustrating the work of the several departments, albums illustrating various phases of the student life, including photographs of the classes, athletic teams, and the like. There are also photographic enlargements showing students at work in the laboratories, and a number of models of vessels made by undergraduates of Course XIII. The new work of the Laboratory of Industrial Chemistry and Chemical Engineering will be presented in considerable detail. Two or three complete preparations, including specimens of the raw material, photographs of the apparatus used, specimens of the finished products, and full working drawings of a chemical plant designed to carry out on factory scale the experiments of the laboratory, will be shown in their logical sequence. In addition to the main exhibit of the Institute many of the departments will be represented in the general government exhibit of Land Grant Colleges. The Mining Department in addition to these exhibits will have another in the Mining Building.

Letters received from Professor Gardner, who is in charge of the installation of the exhibit at St. Louis, give assurance that all will be in readiness on the day of the opening of the Exposition, and that the exhibit compares very favorably with the surrounding ones of other colleges.

NOTABLE MEETINGS

The North-eastern Section of the American Chemical Society.—The last two meetings have been of rather more than usual interest, each attracting an audience of over one thousand members and friends. At the January meeting Mr. E. Stütz, of New York, gave a demonstration lecture on the Application of the new material, Thermit to Engineering and Metallurgy. The reduction of a large ingot of metallic nickel from its ore and the welding of two pieces of wrought-iron pipe were among the experiments carried out on the platform.

On February 25 Professor E. Rutherford, of McGill University,



Montreal, lectured on "Radio-activity." Although many of the more easily discovered properties of radio-active bodies have been first described abroad, it remained for Professor Rutherford to make the observations which led to the establishment of a consistent theory of radio-activity. His discovery of the emanation of radium, and his prediction that this should be transformed into helium, later to be verified in the laboratory of Sir William Ramsay, forms one of the most interesting chapters of modern science. The condensation of this emanation at the temperature of liquid air and many other properties of this wonderful substance were shown.

American Institute of Electrical Engineers.—The third regular meeting of the Boston Branch of the American Institute of Electrical Engineers was held in the Lowell Building, February 3. The papers of C. R. Steinmetz and W. I. Slichter on alternating current railway motors, presented at the last meeting of the main body, were read and discussed. Mr. H. A. Morss, of the Simplex Electric Company, addressed the Institute on March 2, his subject being "The Manufacture of Insulated Wires and Cables."

Meetings of the branch are held the first Wednesday of every month. Members of the (undergraduate) Electrical Engineering Society have a standing invitation to attend the meetings.

RECEPTION TO MRS. WILLIAM BARTON ROGERS.

On the afternoon of March 4, from four to six, in response to a formal invitation, about two hundred members of the Corporation, Faculty, and earlier classes of the Institute met at the Technology Club to greet Mrs. William Barton Rogers. During the day Mrs. Rogers had received many beautiful flowers, including roses from the Class of 1905. There had also been sent to her a silver tea-tray from the classes 1868–1885, with the following letter:—

Mrs. WILLIAM BARTON ROGERS, 117 Marlborough Street, Boston:

My dear Mrs. Rogers,—I am commissioned by your friends of the classes of 1868 to 1885 of the Massachusetts Institute of Technology to beg you to accept this piece of silver as a symbol of our pleasure and grat-

itude that the 4th of March, 1904, finds you the same strong friend, mature in understanding, but youthful in spirit, whom we as students first had the privilege to know.

We rejoice to see on this day that the Founder of the Institute is still a living presence in the councils and a vital force in the policies of the institution which, fifty years ago, his mind clearly conceived and to which his noble life was absolutely given.

We are proud to realize that the constructive work for higher education accomplished by President Rogers and his immediate associates is now recognized as the greatest of the nineteenth century.

And we are glad of the opportunity to show our appreciation of the fact that Professor Rogers could not have done what he did except for the ceaseless devotion, the unflagging care, the extraordinary co-operation, and the personal sacrifice of her whom we this day honor ourselves by honoring.

It is blessedly evident that your life has become so identified with that of the Institute as to have learned the secret — shared by all good colleges — of perennial youth. Therefore, our birthday wish is that next year and all the years thereafter will find you, as 1904 finds you, the youngest, the most enthusiastic, the most devoted of all Institute graduates.

With most heartfelt wishes for your best health and happiness, I remain,

Your very devoted fellow-alumnus,

JAMES PHINNEY MUNROE,

Class of 1882.

Mrs. Rogers's pleasure in this gift is expressed in the following letter: —

117 MARLBOROUGH STREET, March 7, 1904.

To the Classes 1868–1885, Graduates of the Institute of Technology:

Dear Friends,— It is difficult for me to express the emotion I felt when on March 4 I was surprised by receiving your beautiful gift with its simple inscription, so eloquent to me of your regard and of your loyalty to the school. I think you will appreciate my feeling of gratitude that in your minds my name is linked with that of the first President of the Massachusetts Institute of Technology.

I wish that I might express to each of you personally this grateful sense of your kindness; but I can only say that, as I have been able to follow your lives, I am truly happy to know that the school we all prize has been so greatly honored by its graduates.

Believe me most gratefully and respectfully yours,

EMMA ROGERS.

GENERAL NOTES

A committee of the Faculty has been appointed, with the President as chairman, to report plans for the due observance in December of the one hundredth anniversary of the birth of President Rogers.

During the first week in March the following bequests were made to the Institute: Mr. G. B. Upton, \$5,000; and Mr. James H. Danforth, \$5,000. By the will of Mrs. Lydia Gove Choate, of Woburn, Mass., five-twentieths of her estate will go to the Institute. Mr. Choate was a business associate of the late Hon. John Cummings.

Professors Rambeau and Vogel, respectively, are giving elective courses in French and German conversation and correspondence, open to members of the instructing staff and to students. Preparation in French II. or German II. is sufficient. Professor Rambeau has been appointed lecturer in French for the next year at Harvard University.

Mr. C. H. L. Johnston, of the English Department, delivered a course of five lectures, during March, on the various battles and campaigns of the Civil War carried on in the vicinity of the Potomac River. They dealt especially with the military tactics and strategy employed by both Southern and Northern armies.

Professor William T. Sedgwick was elected president of the Yale Alumni of Boston at their meeting of Feb. 10, 1904.

The Institute has accepted an invitation for representation at the Jubilee Celebration at the University of Wisconsin, which comes, however, unfortunately at the same time with the June Reunion in Boston.

The department of economics and sociology of the Carnegie Institute is to prepare an economic history of the United States. The work will embrace eleven subjects, which are assigned to leading authorities. Money and banking will be considered by Professor Davis R. Dewey.

Professor William H. Walker has been appointed expert in charge of the chemical engineering exhibit, including analytical, or-

ganic, and applied chemistry, of the so-called "land-grant colleges," of which the Institute is one, at the St. Louis Exposition. He is now engaged in arranging for the exhibits of the various colleges concerned, and will later go to St. Louis to direct their installation. Professor William H. Lawrence holds a similar relation to the collective exhibit of departments of architecture.

In connection with President Eliot's recent seventieth birthday the following letter was addressed to him by members of the Faculty:—

PRESIDENT CHARLES W. ELIOT, Harvard University, Cambridge, Mass.:—

Dear Sir,—The members of the Faculty of the Institute, recalling your early connection with it, tender these cordial congratulations on the attainment of your seventieth birthday and their high appreciation of your eminent service to education and the public welfare.

Respectfully yours.

President Eliot's reply is as follows:—

HARVARD UNIVERSITY, Cambridge, April 1, 1904.

Dear President Pritchett,—You were good enough to bring me yourself on my seventieth birthday the congratulations of the members of the Faculty of the Massachusetts Institute of Technology. May I beg you to communicate to them, as you have opportunity, my hearty thanks for their kind words about my service to education and the public welfare? I have always been grateful to President Rogers for giving me the opportunity to work for the Institute during its earliest years. Lessons which I learned from him and from my colleagues in the first Faculty of the Institute have been fruitful in other fields. I am grateful for the good wishes and the esteem of the Faculty of the same Institute become strong and powerful.

I am, with high regard,

Very truly yours,

CHARLES W. ELIOT.

Professor J. B. Sewall, of the Corporation, returned from abroad on March 11, after an absence of more than three years. He left New York for the Mediterranean in February, 1901. He visited Egypt, and went up the Nile as far as the first cataract and Philæ;

then to Palestine, with Damascus and Ba'abek; Greece by way of Rhodes, Chios, and Smyrna; Italy (Naples, Rome, Florence, Venice, and Milan); Switzerland (Engadine, Interlaken, and Chamouni); Holland, England, Scotland (up west coast by Oban, Isle of Skye, and Gairloch to John O'Groats), and Wales (whole length from Llandudno to Tenby). The winter of 1901-02 was spent in study at Oxford. In the spring of 1902 a tour of the south of England from Canterbury to Land's End, returning by north coast of Cornwall and Devonshire; then a trip to Norway, visiting the fiords of the west coast and the North Cape; next a tour of Ireland and attendance at a meeting of the British Association at Belfast and a second trip in Wales. The winter of 1902-03 was spent in London, followed in the spring by a trip in the south of France, visiting Bordeaux, Biarritz, Pau, Carcassonne, Nîmes, Avignon, and Grenoble. The summer of 1903 was occupied with a trip across Norway and Sweden (Gotha Canal) to St. Petersburg, touching at Hango and Helsingfors in Finland, and thence to Moscow, Warsaw, Prague, and Vienna. The autumn and winter were spent in the Isle of Man and Liverpool.

DEPARTMENT NOTES

ENGLISH

In addition to the regular English exercises of the first and second year the department receives for correction written work done by the pupils as exercises in their other studies: frequently, from Freshmen and Sophomores, translations from French and German; occasionally, from upper-class men, memoirs prepared for the courses in Chemistry, Physics, Architecture, and Civil and Electrical Engineering; and weekly, from Seniors in the course in Mining Engineering, translations of technical memoirs in French and German. With these pieces of written work the department can do little more (since the writers are not afterward required to rewrite satisfactorily) than criticise and suggest corrections and improvements; but the comments are felt to be valuable in themselves, and as a reminder of the importance of sensible English in technical writings. Inex-

cusably inferior work in these exercises warrants the department in requiring of the writer further work in the special section in English Composition.

In the Freshman English work it has been considered necessary to devote four weeks of the second term to lectures by Professor Bates, reviewing the fundamental principles and the commoner errors of English grammar. Though there is neither time nor necessity for elaborately technical study of grammar, the student's ignorance of simple rules, frequently even of the parts of speech, makes it difficult or impossible for him to correct or even to see absurd incoherence in his sentences. The lectures could not, of course, be adequately supported by exercises in class; but it was believed imperative in some way to supply at least partially the inadequacies of the Freshman's previous schooling.

Of these lectures on grammar the students were required to make written reports. The department has, in view of the large number of advanced subjects presented mainly in lectures, felt it a duty, and has previously conducted exercises for the purpose, to train the Freshmen in taking notes from oral instruction, and in afterward writing out such notes into concise, substantial reports which should preserve the proportions of the lecture. This sort of exercise, like so much else required in the English Composition work, is mainly an exercise in attention, in perception of relative value and proportion, in thinking straight and reporting adequately, and should be of immediate and considerable value to the student in all his lecture courses.

PHYSICS

The Physical Department has recently acquired a novel form of the Cavendish apparatus for determining the constant of gravitation. For the torsion pendulum a quartz fibre suspension is employed, and the gravitational attraction exerted upon the pendulum balls by two lead spheres each about three inches in diameter is sufficient to cause a considerable twist in the fibre, and a large deflection of a beam of light reflected from a mirror attached to and turning with the rod joining the balls. It is expected that it will now be possible as

never hitherto to repeat this classical experiment in the lecture-room.

The optical laboratory has recently added to its equipment an improved form of Littrow spectroscope by Gaertner, similar to one built under the direction of Professor Michelson, of Chicago University, for use with his échelon. The apparatus is of the highest workmanship.

The instrument may be used without the échelon as a Littrow spectroscope of high dispersion corresponding to that of two or four prisms; as a Littrow spectroscope with échelon; or the échelon may be used alone without the prism combination.

The apparatus is already in use in an investigation by one of the fourth-year students in Course VIII.

CHEMISTRY AND CHEMICAL ENGINEERING

Among the instructors who have joined the teaching corps of the Chemical Department during the past year are Dr. Arthur A. Blanchard, Dr. John W. Brown, and Dr. Miles S. Sherrill, all of whom have recently returned from study in Germany, each having held a Fellowship from the Institute for two years. Dr. Blanchard attended the University of Leipzig, Dr. Brown that at Heidelberg, and Dr. Sherrill those of Leipzig and Breslau, receiving his doctorate from the latter. All devoted themselves mainly to research work in physical chemistry. Dr. Blanchard returned from Germany in 1902, and taught successfully at the New Hampshire College, Durham, N.H., last year.

In addition to the three instructors just named, Dr. Livingston W. Smith, a graduate of Washington and Lee University, who later received the degree of Ph.D. from the same university, and Mr. Leslie R. Moore, who has studied at Heidelberg and since taught successfully at Colby University, have had a share in the teaching of inorganic chemistry; and Dr. R. B. Earle, a graduate of Harvard, who has since been assistant at Chicago University, is serving as assistant in organic chemistry. Mr. F. R. Kneeland, instructor in analytical chemistry, is a graduate of Columbia University, and has studied for some time at the University at Geneva. This is his second year of service at the Institute.

The members of the graduating class are now busy with thesis work in the various branches of the department. Among the subjects taken up for investigation in the industrial laboratory by Senior students in chemical engineering, under the direction of Professor Walker, are the examination of the action of sea-water upon cements, to determine which of the constituents is most readily removed; an examination of the distillation products of peats of American origin and the nature and worth of the coke obtained from these peats; and the study of the production of electrolytic bleach liquor with reference to certain economic considerations; while Dr. Gill has under his direction thesis work relating to the determination of carbon monoxide in gaseous mixtures and a study of the destructive effects accompanying the explosion of certain other combinations of gases.

The Senior chemists who have theses of an industrial character are investigating such problems as the causes for the greater rapidity and thoroughness of the bleaching action when sodium hypochlorite replaces the calcium salt of bleaching powder; the action of the enzymes in castor oil beans in the saponification of the oil; the methods for the purification of rosin; the hydrolysis of acetylene and the possible subsequent production of chloroform; and the conversion of safrol to eugenol. Investigations in organic and in theoretical or physical chemistry are also being carried on by other fourth-year chemists.

MINING

There has recently been installed in the department of mining engineering and metallurgy a four-foot Wilfley table. The six-foot Wilfley table which was already in the laboratory was received from the firm in Denver, and has two planes of treatment, the roughing plane and the finishing plane, in the same manner as the full size machines, differing from them in the fact that the angle between the two planes is greater than in the case of the large table, causing any disadvantage that may follow from two planes to be exaggerated. The new four-foot Wilfley has been designed to have the roughing and finishing planes coincident; that is, as a single

plane. The effect of this improvement has already been shown, in the work of the students of the present class, in the production of better work than the six-foot Wilfley has been able to do.

A new magnet has just been added to the equipment of the laboratory, for separating the magnetic from the non-magnetic material. It transpires in magnetic separation that, when the magnetic force is applied to the grains in a layer of mixed magnetite and quartz, the magnetic grains carry up with them non-magnetic grains of quartz, which in this way are delivered as magnetic grains while they belong in the waste or refuse. The Ball-Norton magnetic machine overcomes this difficulty by conveying the grains so picked up by a series of magnets of alternate polarity, north pole, south pole, north pole, etc.; and, as the grains pass from one pole to the next, they are completely inverted in position, and allow the entangled quartz grains to tumble out and be separated from the magnetic grains which compose true concentrates. This new magnet is designed to be with 16 poles of alternate polarity, and the grains carried by these 16 poles by means of a thin travelling belt make a very complete separation of non-magnetic grains from the magnetic.

A Wilfley slimer has recently been added to the equipment of the laboratory. It is the latest production of the fertile brain of Mr. A. R. Wilfley, of Denver. Previous to his invention the canvas table, followed by the steep vanning belt, had proved to be the most effective concentrator for the finest grades of slimes. This new machine of Mr. Wilfley's takes up this problem, and solves it with one machine. The machine is, at the present time, on trial in a number of Western mills; but it made such promise of success when Professor Richards was in Denver last summer that he ordered a small test machine for the laboratory of the Institute. This machine is just now being connected with the power, and will have made its maiden run before this article goes to press. No report can therefore be made as to the results in the laboratory.

ARCHITECTURE

The Architectural Department is greatly to be congratulated because of the active sympathy which it has always received since its inception, from the Boston Society of Architects. At the society's annual meeting for choice of officers the appointment of a committee to visit the department is always made part of the regular routine, and the good precedent established as long ago as 1868 is regularly followed in offering two prizes of the value of \$50 each in books, to the two students whose efforts during their years at the Institute have shown the best results. Better than all, when the prizes are awarded, the occasion is made the opportunity to bring together the Society of Architects and the upper classes of the department; and the welcome given to the younger men so soon to enter upon the practice of their profession is always hearty, and is thoroughly appreciated.

The problem in design, on which the two prizes of the society are awarded, occupies the first part of the last term. Then comes a less important work, a sketch problem to serve as a breathing spell, after which begins in dead earnest the thesis. This year the subject given was a stone window of generous size, supported on corbelling and built high enough from the ground to give opportunity to make the feature of the support a very important one. Various classic examples were referred to as suggestive, and the solution of the problem was to represent a thoroughly practical piece of work. The scale was large, after the manner of a working drawing, so that there should be full opportunity for the competitor to show his ability in composition, decoration, construction, etc., and, with all, a fine quality of draughtsmanship. The drawings are approaching completion, and the results bid fair to be exceedingly satisfactory.

It is curious that not more encouragement is given this department by the public outside the profession. Once in four years the accumulation of yearly income from a small fund, the bequest of an architect, amounting to \$1,000, serves to send a graduate for a year's study in Europe; but the department has no other scholar-

ship endowment. It shares with the other departments from the funds which have been left so generously for the common good, and in addition to this the Institute does all that its means permit. But the benefit of this assistance is, of necessity, mainly given to undergraduates. Graduate work in architecture merits the encouragement of larger and more certain aid than it has thus far received. It is at this period of a student's career that pecuniary assistance is likely to have most far-reaching results. If, after one year of graduate work, another of foreign study can be offered by the Institute, the opportunity comes at a time when it is most valuable. This can only be done, however, through the creation of endowed scholarships at the disposal of the department. It is hoped that the interest of the public may be sufficient to establish these.

A portion, at least, of such endowments ought not to be so restricted as to benefit needy students alone. Prizes and scholarships possess a higher dignity when they are given for the encouragement of art, and not merely for the personal advantage of students. It is highly desirable that there should be within the gift of the Institute, travelling scholarships and other prizes to be awarded solely upon the basis of distinguished merit. The attainment of such scholarships by students whose private means may perhaps place them outside the category of those requiring charitable assistance would, in many cases, result in prolonging and enriching their professional training in a way to react most favorably upon the artistic standards of the country.

Uncommon opportunities are offered here for advanced work, and the signal results shown prove to what extent they are appreciated. Graduates from other architectural schools are already coming here for the advanced degree, and no greater stimulus could now be applied than that coming from the sympathy of a generous public. Cornell has a yearly scholarship of one thousand dollars. So has the University of Pennsylvania. Columbia has two. The Harvard Architectural School, young as she is, has one. The Washington University of St. Louis, with its architectural school only two years old, has one. The Institute, the oldest of them all, should not be less favored.

NAVAL ARCHITECTURE

SPEED AND SERVICE TESTS AT SEA

A very complete and interesting test was recently run on the steamship "Nantucket" of the Merchants and Miners Transportation Company by Senior students in the Naval Architecture course. The boat was on one of her regular trips from Boston to Baltimore, and the test was run under service conditions. The object of the test was threefold: first, to determine the power used to drive the boat at various speeds; secondly, to find the evaporative power of the boilers; and, thirdly, to get the steam consumption and power of all the auxiliary machinery when running under normal conditions.

The boat is a single-screw steamer about three hundred feet long over all, and propelled by a triple expansion engine. The main engine was indicated throughout the entire duration of the test, and the quality of steam supplied to it determined by a calorimeter. The main feed-pipe was broken between pump and boilers, and a bye-pass with a high-pressure water meter inserted, through which all the water was fed during the test. Forty-seven tons of coal were weighed into a transverse bunker, which was not opened until the test commenced, and the test was continued until all the coal was burned.

All the auxiliaries were indicated for power, and the steam consumption obtained by measuring the flow of steam through orifices and valves leading to each pump. The speed of the ship was obtained by means of an electric log towed from a twenty-two foot boom rigged over the quarter-rail, so the log would clear the wake. The weather conditions were propitious, and very satisfactory results were obtained, some of which follow:—

Duration of test	20½ hrs.
Total coal consumed	47 tons
Total water evaporated	922,300 lbs
Horse power of main engine	2,362
Combined H. P. of auxiliaries	90
Total machinery H. P.	2,452

Steam per H. P. per hour (total machinery)	18.4 lbs.
Coal per H. P. per hour (total)	2.1 lbs.
Water per pound of coal	8.76 lbs.
Speed of vessel (average)	14.95 k.
Displacement at trial (approximate)	3,100 tons

MILITARY SCIENCE

Captain William Baird, who has been in charge of the military department as Professor of Military Science and Tactics for the past three and a half years, has been relieved from duty here, and detailed for duty with the militia of Maryland, on the governor's staff, as representative of the War Department. The class of '07 presented Captain Baird with a new regulation sabre and belt February 13, after Military Science.

In the absence of a regular army officer, Lieutenant Worcester, who has been Captain Baird's assistant, will assume the charge of the department.

THE UNDERGRADUATES

THE TECH SHOW

"Simon Pure Brass," the fifth annual show, will be given this year at the Hollis Street Theatre on the afternoons of April 26 and 29. Rehearsals have been going on for a month, and, as the men have thrown themselves into the work with much enthusiasm, great progress has been made. "Simon Pure Brass" is rather above the average in many ways. The heavy comedy part which gives the show its name is Professor Simon Pure Brass, ex-impresario and general charlatan. To escape from his stranded vaudeville troop, he absconds in a balloon. The balloon in the course of its travels lands in a tree, and spills the professor, bag and baggage, upon the grounds of Granite University. The students, when they see a suit-case labelled Prof. S. P. Brass drop from the clouds, imagine it to be the property of their expected professor of psychology; and, when Brass follows his suit-case, he is received as this professor. The troubles that result may be imagined, and it may be said that the leading parts are in the hands of men who will take advantage of every opportunity.

The management this year decided officially to place the Tuesday and the Friday performance on a par. The Tuesday performance has been called the "Public Dress Rehearsal"; but the title was a misnomer, and tended toward making a disproportionately large demand for seats for Friday. This year by this action of the management, together with the fact that President Pritchett and Governor Bates will attend Tuesday's performance, has done much to equalize the demand.

The management is: general manager, P. M. Smith, 1904, of Syracuse, N. Y.; business manager, Ernest Harrah, 1904, of New York City; assistant business managers, F. S. Hamilton, 1907, of South Blue Hill, Me.; R. W. Parlin, 1907, of Wollaston; stage manager, P. E. Hinkley, 1905, of Portland, Me.; assistant stage managers, K. E. Terry, Jr., 1906, of New Bedford; R. G. Kann, 1907, of Pittsburg.

PROFESSIONAL SOCIETIES

Civil Engineering Society.—A meeting was held on January 4, at which Mr. C.-E. A. Winslow, of the Institute, spoke on "Municipal Sanitary Engineering." On March 28 Mr. Frank B. Gilbreth spoke upon "A Contractor's View of the Baltimore Fire." Mr. Gilbreth is one of the most prominent contracting builders of the East, and is well known at the Institute, not only as a builder of the Lowell Building and Engineering C, but also as a lecturer. Numerous slides which were procured immediately after the fire were shown. The seventh annual dinner was held at Hotel Westminster March 31. President Tuttle and members of the Faculty and instructing staff were present, as well as a number of engineers.

Mechanical Engineering Society.—About seventy-five men were present at the meeting of the Mechanical Engineering Society at the Union, February 19. Mr. F. S. Green, of New York, spoke on rope transmission.

The annual meeting was held at the Union March 25. The election of officers was followed by a talk by Mr. L. H. Kunhardt, '89. The election resulted as follows: president, G. D. W. Marcy; vice-president, D. A. Stewart; secretary, J. N. Flynn, Jr.; treasurer, F. Goldthwaite; Executive Committee, N. Lombard, P. E. Hinkley, and J. M. Lambie. A vote of thanks and gavel were given to E. O. Hiller, the retiring president.

Mining Engineering Society.—A regular meeting was held Friday, February 19. An amendment to the constitution, changing the dates of meetings to the first Wednesday in each month, was proposed; and a number of Sophomores were elected to membership. Mr. R. H. Allen gave a talk on "Copper Mining."

The society was addressed by Professor Richards on March 4, his subject being his summer trip through the North-west and Alaska. His lecture was illustrated by stereopticon views. On March 21 Mr. Foster, a mining engineer, gave an informal talk on some of his mining experiences in Arizona. At the Union, on March 25, Mr. W. R. Ingalls, '86, a prominent mining engineer,

addressed the society on "The Commercial Side of Metallurgical Practice."

Chemical Society.—On January 8 the society united with the Boylston Chemical Club of Harvard in a meeting at the Harvard Union. Mr. Forbes, president of the Harvard Society, welcomed the Tech Society, and introduced Professor Richards, of Harvard, who spoke on "Some Recent Theories upon the Constitution of Matter." A joint meeting of the Boylston Chemical Society of Harvard and the Chemical Society of the Institute was held at the Union April 4. Professor Arthur A. Noyes gave an account of a process for "Photographic Reproduction without Light," illustrating his lecture with several experiments.

Electrical Engineering Society.—A meeting was held at the Tech Union on February 18, a talk on the "Automatic Telephone Exchange" being given by Mr. J. B. Baker, '90, consulting engineer for the Automatic Company.

On March 15, Mr. Odin B. Roberts, '88, spoke on "The Procedure of an Inventor to secure the Rights of a Patent."

Geology Journal Club.—At the meeting held the first week in January, Professor A. W. Grabau, '96, now of Columbia University, presented his new classification of rocks, and pointed out the advantages of such a classification. The programme for the meeting of January 6 was as follows: W. G. Ball, "The Quicksilver Mines of India"; C. E. Danforth, "Asphalt Mining and Refining in the Indian Territory"; T. B. Ternan, "A Great Japanese Coal Company"; S. Shapira, "Secondary Enrichment of Ores."

CLASS ORGANIZATIONS AND CLUBS

1904 *Dinner.*—The dinner held February 25 at the Union attracted over fifty members of the class. W. H. Eager was toastmaster. G. W. Eastman gave interesting details about the coming Alumni Reunion, and Mr. Blachstein sustained his reputation as an after-dinner speaker.

1905 *Dinner.*—On March 3 the class held its annual dinner at the Union. Over one hundred and forty were present. The tickets were in the form of roll slips. The toastmaster was J. H.

Holliday, Jr., and from the instructing staff the following responded: Professors Bates, Tyler, and Clifford, Mr. Albers, and Mr. Lam-birth. From the class these men responded: L. T. Bushnell, Norman Lombard, C. D. Klahr, and E. C. Weaver. After the speaking there was general singing of Tech songs.

1906 *Class Dinner*.—The class held its dinner at the Tech Union March 8, one hundred and fourteen being present. The toastmaster was Rutherford Bingham. President J. P. Lawton responded to the first toast. He was followed by Walter E. Hadley, '04, who spoke on "*Technique*," M. E. Vinton on "*Physics*," M. A. Coe on "*Athletics*," and A. P. Mathesius on "*Margaret Cheney*." Among the impromptu speakers were Dean Burton, Mr. Rand, and Secretary Tyler.

1907 *Class Dinner*.—The class held its dinner at the Union on March 11. About one hundred and forty members were present. President Otis introduced H. A. Middleton as toastmaster. Dean Burton was the first speaker. He urged the class to have more informal affairs at the Union, so that the members could become better acquainted with one another. Dr. Talbot, the next speaker, gave a very interesting talk. Mr. Powers then gave a humorous talk. After the dinner the Freshman Orchestra played several selections. R. Landers, accompanied by E. H. Packard, entertained the class with vocal solos; and the evening came to a close with the general singing of Tech songs.

Deutscher Verein.—At a meeting on March 5 a constitution was adopted, and the following officers were elected: president, E. F. Kriegsman; vice-president, Eugene Burton; secretary, Norman P. Gerhard; treasurer, Harry M. Nabstedt; Executive Committee, E. F. Kriegsman, Fred C. Lutze, O. C. Merrill.

An enthusiastic dinner was held at the Union March 24. Following the admirable plan of the society, only German was used in conversation. If this aim is consistently upheld, it will be an innovation. The similar organization at Harvard does not attempt to make exclusive use of German, except in its plays; and the same is true in other places.

Chicago Club.—The club held their annual dinner at Hotel

Thorndike on February 18. F. H. Davis, last year's president, acted as toastmaster. C. E. Warren was elected president for the ensuing year, W. J. Knapp vice-president, and H. J. Mann secretary and treasurer.

Pennsylvania Club.—The dinner given by the newly formed Pennsylvania Club at the Tech Union, March 10, was very successful. During the evening the following officers and Executive Committee were elected: president, R. S. Beard, '05; vice-president, K. H. Disque, '06; secretary, C. S. Dean, '07; treasurer, C. H. Shapleigh, '06; Executive Committee, J. M. Lambie, '05, F. M. Fuller, '06, G. D. Luther, '07. Thirty-two members, or two-thirds of the Pennsylvania men at the Institute, attended.

The Missouri Club held a very successful dinner at the Union on the evening of February 19.

Y. M. C. A. MEETING

The annual meeting of the Christian Association was held at the Union on March 1. L. T. Bushnell spoke of the great influence that Dwight Hall had in shaping the religious side of undergraduate life at Yale. C. Campbell, former president of the Philadelphian Society at Princeton, sketched the history and steady growth of that society, and pointed out that its members were the representative men of the university in football, baseball, track, and debating teams. M. T. Lightner spoke of the association work at Harvard, calling attention to the fact that there were more men actively interested in it than in football. Mr. J. E. Smiley, who is college secretary, spoke on association work at Northwestern University.

M. T. Lightner was elected president for next year, R. N. Whitcomb vice-president, N. C. Willey secretary, and W. H. Trask treasurer.

THE HONOR SYSTEM

From the *Tech* Jan. 7, 1904

"Now that the first term of the collegiate year, 1903-1904, is rapidly drawing to a close, with the mid-year examinations only a

fortnight ahead of us, the question naturally arises in the minds of all those who have had the matter of the honor system at all in their minds, What is going to be done about it? Are we, or are we not, going to take these mid-year examinations under that system?

"It is to answer these questions that the committee submits the following statement to the students of the Institute, and especially to the Senior Class, hoping that it will meet with the approval of its members.

"Enough has been said on the subject of the honor system itself as practised in other colleges. We are familiar with the conditions to be met, the advantages to be gained, the difficulties to be overcome, were such a system instituted at Tech. Sufficient time has elapsed to allow every one to make up his mind whether or not the honor system would be desirable here. The matter was not rushed through, purposely to insure a reasonable consideration on the part of all concerned.

"It was evident from the first that the honor system could not be adopted unless there was among the Faculty and student body a strong, enthusiastic, and practically unanimous sentiment in its favor. The committee is now able to state decisively that such a unanimous sentiment in favor of the honor system does not exist, and, furthermore, that a considerable number of Seniors, as well as several members of the Faculty, are strongly opposed to it, on the ground that the conditions at Tech are not favorable.

"Such being the case, it seems hardly necessary to go any farther. For the time, at least, we are better without the honor system. Should the students of the Institute in a future year wish to take the matter up again, we sincerely hope that the data on the subject, soon to be turned over to the records of the Institute Committee, will prove useful.

"Respectfully submitted,

"G. BOUSCAREN, JR.,

"For the Committee."

SENIOR ELECTION

Out of the large number of candidates who competed for Class Day honors in the Senior Class election, March 28, Currier Lang, of Cambridge, won the first marshalship; L. G. Bouscaren, of Cincinnati, was elected second marshal, and W. H. Eager, of Syracuse, third marshal. All are fraternity men,—a fact which shows the increasing popularity of fraternities and fraternal life at the Institute.

The committee is as follows: George E. Atkins, Newton Highlands; Arthur W. Bartlett, Newburyport; L. G. Bouscaren, Cincinnati; Bernard Blum, Chicago; John F. Card, Chicago; William W. Cronin, Syracuse; William H. Eager, Syracuse; Guy W. Eastman, Vancouver Barracks; Merton L. Emerson, Braintree; David Elwell, Arlington; Charles R. Haynes, Hyde Park; Amasa M. Holcombe, Winchester; Everett O. Hiller, Hyde Park; Ralph O. Ingram, Lawrence; Currier Lang, Cambridge; John D. McQuaid, Holyoke; George H. Powell, Baltimore; Charles L. Steinrok, Philadelphia; Reginald A. Wentworth, North Cambridge.

THE TECH HOP

The third annual Tech hop, given under the direction of the Freshman Battalion, took place at Paul Revere Hall on Tuesday, January 12. The committee in charge of the affair consisted of the following men: Boles, chairman; Bancroft, secretary; Gammons, treasurer; Rood, McGregor, Chase, Hudson, Christy, Packard, Walsh, Otis, Sage, Ashenden. The matrons were Mrs. Rand, Mrs. Tyler, and Miss Burton.

FRESHMAN BATTALION REVIEW

On March 23, Lieutenant Governor Curtis Guild, Jr., reviewed the Freshman Battalion, Dr. Pritchett being unable to be present.

THE LIBRARY

It is hoped that Tech men will take advantage of the fact that the General Library is now kept open until 10 P.M.

ATHLETICS

THE INDOOR MEET

The annual indoor meet took place at the Gymnasium January 7. Dr. and Mrs. Pritchett and many members of the instructing staff were present, and also a considerable number of students. The Mandolin Club was also on hand to play whenever it was possible to do so without interfering with the contests. The Freshmen won the meet, scoring $29\frac{1}{2}$ points. Summary of events:—

35-YARD DASH.—FINALS.—First, Lightner, '06; second, Noyes, '07; third, Lang, '04; fourth, Richards, '07. Time, 4 2-5 s.

RUNNING HIGH JUMP.—First, Farrington, '05; second, Curtis, '04; third, Emerson, '05; Burleigh, '06. (Tie for third place.) Height, 5 ft. $7\frac{3}{4}$ in.

35-YARD HURDLES.—FINALS.—First, Noyes, '07; second, Haynes, '04; third, Farrington, '05; fourth, Needham, '04. Time, 5 s.

PUTTING 16-POUND SHOT.—First, Barrows, '07; second, Paquet, '05; third, Curtis, '04; fourth, Baker, '04. Distance, 34 ft. 3 in.

POTATO RACE.—FINALS.—First, Howe, '06; second, Chapman, '07; third, Marcy, '05; fourth, Lorenz, '05. Time, 53 4-5 s.

POLE VAULT.—First, Curtis, '04; second, Tetlow, '07; third, Farrington, '05; fourth, Kenway, '06. (Tie for second place.) Height, 10 ft.

MILITARY RELAY RACE.—Won by 1907.

SUMMARY OF POINTS.—1904, 18; 1905, 17; 1906, $12\frac{1}{2}$; 1907, $29\frac{1}{2}$.

OFFICIALS.—Referee, Dean Burton. Judges, Professors Swain, Allen, Talbot, Pope, Park, and Recorder Wells. Timers, Dr. Norris, Major Briggs, and Mr. Jewett. Starter, Coach Mahan. Clerk of Course, Mr. Winslow. Assistant clerk, Mr. Towne.

INTERCOLLEGIATE FENCING

Tech's representatives carried off first honors at the Intercollegiate Fencing Tournament, held in the Hemenway Gymnasium at Harvard March 4. The team, composed of Lage, Gatewood, and Riley, took 18 out of 27 bouts. Pennsylvania was second with 14, Yale third with 12, and Harvard last with 10. Captain Lage was the star of the tournament, winning all of his bouts, while Gatewood of Tech tied for second place with Captain Frick, of Pennsylvania, with 8 out of 9.

CROSS COUNTRY ELECTIONS

At the second meeting of the second term the following officers for the ensuing term were elected: president, W. K. Major, '07; secretary, F. P. Poole, '05; manager, L. F. Meyers, '04; captain, E. T. Lorenz, '05; chase captain, B. B. Holmes, '07. It is the intention of the association to arrange runs with different colleges in the spring.

N. E. I. A. A. MEETING

At the annual meeting of the New England Intercollegiate Athletic Association it was decided that the meet would be held May 20 and 21 at Worcester. The bicycle race was eliminated from the programme of events.

The following officers were then elected: W. I. Hamilton, Amherst, president; R. E. Hall, Bowdoin, vice-president; H. J. Mann, M. I. T., secretary; E. J. Goodwillie, Williams, treasurer. President W. I. Hamilton, Treasurer E. J. Goodwillie, J. T. Maynard, Dartmouth, T. E. Jewett, M. I. T., C. H. Hull, Brown, T. R. Barrett, University of Vermont, Executive Committee.

THE GRADUATES

THE NORTH-WESTERN ASSOCIATION OF THE M. I. T.

The following letter was received from the secretary on March 11:—

Your letter of February 27 was turned over to the writer by Mr. Lansingh the first part of this week. I have been trying very hard, indeed, to write an article for the REVIEW, but have been unable to find time to do this. In order, however, that you may have some data, I am sending you a printed report of the dinner, which was published in last week's issue of the *Western Electrician*. Undoubtedly, the remarks of Dean Burton were of much more interest to the graduates than those of outside speakers. One of the interesting features was the impersonation of James J. Hill and Mr. McCutcheon by two of the worthy members of the North-western Association.

The splendid work done by the officers and Executive Committee of last year has developed a wonderful amount of personal enthusiasm among the members of the North-western Association. At our informal dinners we had an average attendance of about sixty, and wound up with a grand total of one hundred and twenty at the annual banquet.

Professor Burton's remarks regarding the possible affiliation of Tech with Harvard University were received with much interest by members of the Association. The universal verdict of those present was against any union of Tech with Harvard University. This opinion was ably defended by Mr. Louis A. Ferguson, '86. Enclosed find the sum and substance of Mr. Ferguson's address at the banquet. We believe that the alumni of Tech would gladly subscribe in some such way as suggested by this article; and we further believe that, if the graduates would bind themselves to subscribe in this manner, the amount would be duplicated by some individual interested in the success and individuality of Tech.

Besides listening to the sweet melodies of a large concert phonograph, the members of the association had the pleasure (?) of listening to the quartette. We entered the banquet hall in double file to the enlivening tunes of a march by the orchestra; but, unfortunately, the orchestra got into some difficulty with the waiters, and left the hall after rendering the entering march. We understand that this saved the last year's officers and Executive Committee from going into bankruptcy.

FROM THE *Western Electrician*

Lighted by the ghastly rays of mercury-vapor lamps, the University Club banquet hall in Chicago was the scene of one of those interesting dinners given by the sons of old Tech which are said always to show something new or startling for the participants.

The banquet was given on February 27 by the North-western Association, Massachusetts Institute of Technology. The members and guests, to the number of one hundred and seventeen, were greeted, upon entering the banquet hall, by a weird scene produced by six mercury-vapor lamps, which were the only source of light in the room. When seated, the company presented a startling appearance. The red roses upon the table became blue, the champagne green, while the glasses took on a violet hue.

After sufficient time had elapsed for the enjoyment of the scene the lights were turned off and a curtain drawn aside in the front of the hall, revealing a large electric sign decorated by evergreens and bearing the words "North-western Association Massachusetts Institute of Technology" in small incandescent lamps.

Dinner was then served, enlivened by songs from the Glee Club and jokes, which respected no more the dignified class of '76 than they did the class of '03. After dinner the president of the association, Solomon Sturges, made a short address, and then introduced Professor W. E. Goldsborough, the principal speaker of the evening, who had come from St. Louis especially for the occasion. As head of the Department of Electricity at the St. Louis Exposition, Professor Goldsborough outlined briefly the scope of the work to be done in his department. He said that people of to-day are not only looking continually for something new, but for something that is just on the verge of being born. They look for these new things to be accomplished more along the lines of electrical achievement than in any other direction.

The problem before the managers of the Exposition, therefore, is to present something new to the people. Among the electrical features at the fair will be seen an electrical water-purification plant, taking the "thick," "rich" water now pumped into the St. Louis water mains and turning out a pure, clear product. Another electrical process will manufacture nitrogenous compounds from the atmosphere for fertilizing purposes. Three new alternating-current traction systems will be exploited, while space telegraphy and telephony will be conducted with the most powerful apparatus. In connection with the latter exhibit will be what will be known as the "noiseless court," a large empty room, 100 by 200 feet. Persons walking in this

court will be enabled to hear conversation, through the little telephone receivers with which they will be provided, without the intervention of any wiring. This is brought about by producing a powerful electromagnetic field in the room, through outside sources, and by variations of the inductive effect of this field to reproduce in the receivers the words which originally affect the variations in the field. In regard to the lighting effects at the St. Louis Exposition, Professor Goldsborough said that it is the aim of the management to make these even more effective than those at the Pan-American Exposition. The lighting scheme, as planned, embodies the lighting of the whole "picture" of the Exposition in three colors, yellow, green, and purple, the wiring being so arranged that the different colors may be thrown on separately or in combination. Just what the effect will be is as yet somewhat a matter of conjecture, but it is hoped that it will be one of surpassing beauty.

Succeeding Professor Goldsborough, Professor Burton, dean of Massachusetts Institute of Technology, spoke upon various subjects of interest to the old "grads," but principally upon the rumored affiliation of the Institute with Harvard, which has been so much discussed of late. According to Dean Burton, no offer has yet been made by Harvard to the Institute, regardless of what has been stated by the press upon both sides of the question. However, it seems certain that such an offer will be made. By affiliation the Institute will lose its identity, but a fund of \$5,000,000 will be placed at the disposal of the scientific department of Harvard University. The members of the North-western Association, almost without exception, are indisposed toward such a move.

Other speakers during the evening were John R. Freeman, T. W. Robinson, F. K. Copeland, and Louis A. Ferguson. The officers of the North-western Association, which are elected each year by the old officers, were announced, being: president, F. W. Clark, '80; vice-president, C. M. Wilkes, '81; secretary and treasurer, Conrad H. Young, '96; executive committee, with the above, George L. Lavery, '76; R. B. Price, '94; and M. J. Sturm, '96.

Mr. Ferguson's remarks were as follows:—

Mr. President and Gentlemen,—Like my fellow past-president, Mr. Robinson, who has just spoken, the honor of addressing you to-night is entirely unexpected; and I assure you I heartily indorse the sentiments he has so clearly and forcibly expressed. But, gentlemen, I would go one step further. From what we have heard from our worthy dean, Professor Burton,

to-night, it appears that Tech is in need of something more than mere moral support. As the esteemed ex-President of this great country of ours, Grover Cleveland, has said, "it is a condition, and not a theory, that confronts us." What, then, should we do?

Those of us who are members of the various engineering societies — the American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Society of Civil Engineers, — know what is being done to raise large amounts of money for the purchase of land and furnishings for the great engineering building which Mr. Carnegie has generously offered to give, as a home in New York for American engineering. If we are willing, as members of these various societies, to subscribe to this work, should we not be proud to subscribe, as Tech men, to maintain our independence and to perpetuate the name of our dear old Alma Mater? As Americans, have we not been taught to love independence? Why, then, should we allow our good old Tech to be absorbed by the University at Cambridge? Harvard wishes to absorb Tech because she needs the prestige of her engineering reputation; but shall we allow Tech to need Harvard's money? Half a million dollars would make Tech independent of Harvard. There are, we understand, three thousand men in Tech's alumni. An average of \$33 per year, pledged for five years from each of these men, would provide this fund. Many of the more prosperous of the alumni would gladly subscribe liberally for this worthy cause. If money is what Tech needs to maintain her independence, to continue the good work she has performed these many years, let her alumni take the lead in providing the necessary fund.

I would suggest, therefore, to the newly elected officers of the Northwestern Association that they consider this matter well, and, if they deem it advisable, appoint a committee to bring the question of raising such a fund before the general meeting in Boston in June next.

CONRAD H. YOUNG, '96, *Secretary*,
Room 25, 77 La Salle Street, Chicago, Ill.

THE TECHNOLOGY CLUB OF NEW YORK

On Jan. 1, 1904, we had a membership of two hundred, and March 1, 1904, we had two hundred and fifty. This gain has been steady, full of meaning, and promises a most glowing future for our club. There are about five hundred Tech men in New York City. We should like the names and addresses of every one.

On January 13 we had a very interesting meeting, devoted to the subjects "Radium and Actinium." In the early part of the evening about fifty fellows took dinner at the Park Avenue Hotel, after which they and others assembled at the club-house adjourned to Dr. William J. Morton's laboratory at 19 East 28th Street, where the above subjects were presented in a most entertaining and interesting way. George Frederick Kunz, Ph.D., gem expert of Tiffany & Co., gave a technical talk with elaborate demonstrations on the properties of radium and actinium. He fully showed by exhaustive experiments their effect upon precious stones and other substances. In order to carry out his experiments, it was necessary to extinguish all lights in the room. That being done, Dr. Kunz took from his pocket a small piece of radium about the size of a pin-head, which, he said, was of 100,000 activity, and had cost nearly \$300. The radium was enclosed in a glass tube, outside of which there were four other tubes, of copper, iron, rubber, and lead. He then produced the famous "Tiffany Diamond," weighing fifteen carats. In order to show the luminous properties of the radium, he held the diamond about two inches away from the tubes. The light seen was like that of phosphorus. Other experiments were equally interesting.

William James Morton, M.D., professor in the New York Post-graduate Medical School and Hospital, gave some startling and surprising, as well as interesting demonstrations and remarks on the treatment of disease by the X-ray, radium, and ultra-violet rays. Dr. Morton explained in detail the uses to which radium might be put in curing disease, especially those of an internal nature. "Medicine," he said, "is gradually abandoning its old-fashioned concoctions, and we are taking up radium with exceedingly bright prospects." He startled his hearers by talking of a mixture which he had prepared, and called "Liquid Sunshine." By means of this fluid, he said, the whole interior of a patient would receive a sunshine bath the same as the exterior when exposed to the sun's rays. He then exhibited six tubes of "Liquid Sunshine." When these were placed before a strong X-ray, they glowed with a faint light. "That," said the doctor, "would be

the result if the liquid were taken inside." His remarks were received with great interest, and the daily papers for some days after commented upon his statements.

There were seventy-five Tech men present and the following guests: T. C. Martin, Sr.; William Hallock, Professor of Physics Columbia University; Dr. S. A. Tucker, Professor of Chemistry at Columbia; and George F. Sever, Professor of Electrical Engineering.

Our ninth annual dinner was held at the University Club on Feb. 5, 1904. There were one hundred and thirty Tech men present and many prominent guests, of whom our honored president was one. This dinner was called the "Liquid Sunshine Dinner," upon which the papers throughout the country commented before and after. It was a great success in every way, and brought much credit upon the Entertainment Committee. Speeches were made by President Pritchett, the Rev. Minot J. Savage, and Dr. Morton. After President Pritchett's able speech a rousing M. I. T. cheer was given by every man present.

The "Liquid Sunshine" consisted of a portion of esculin, a fluorescent chemical made from the inner skin of the horse chestnut, which was dissolved in a glass of water. A capsule of radium was exposed to this solution for a few moments. The radium acting on the esculin caused the glass to glow brilliantly when exposed to the light made from burning magnesium wire. Tech's welfare and future were drunk in this "Liquid Sunshine" amid great applause and enthusiasm. Every fellow went home feeling that the long-wished-for "Tech Spirit" was at last awakened in New York City.

Breakfasts are now served daily at the club-house to members and their guests between the hours of 8 and 9.15 A.M. and dinners are served at 6.30 P.M. There is a room for transient members, the price being \$1.50 per night with breakfast.

C. R. PLACE, '02, *Secretary*,
36 East 28th Street, New York, N.Y.

WASHINGTON SOCIETY OF THE M. I. T.

The University Club movement, which was started last July and of which some mention was made in the society notes in the January REVIEW, has resulted in the incorporation of "The University Club of the City of Washington, D.C." The success of the movement has far exceeded the anticipation of the most sanguine; and at its last meeting, before organizing, the Central Committee gave a rising vote of thanks to its chairman, Mr. P. L. Dougherty, and to Mr. H. A. Pressey for their untiring efforts and to the Washington Society of the Massachusetts Institute of Technology for projecting a movement which should meet with such wide-spread interest.

In response to the circular letter sent out by the Central Committee, over 800 applications for membership were almost immediately received. It had been decided to limit the number of resident members to 600, but, since the club was formed, it has been deemed expedient to increase this number to 800.

On Saturday evening, March 12, a mass meeting of over 400 men was held at Rauscher's to discuss the location and character of the club-house and other matters of importance. The meeting also afforded an opportunity for those present to meet the president of the club, Hon. William H. Taft, Secretary of War, and the other officers. Before the discussion of business matters a history of the club was read by the assistant secretary, Isaac R. Hitt, Jr., and received with much enthusiasm. Particular mention was made of the fact that the movement originated with the Washington Society of the Massachusetts Institute of Technology, and that its success was due in great measure to the energy of the representatives of the society.

Following is a list of the officers who, with four other members, constitute the council of the club: —

William H. Taft, president; George B. Cortelyou, first vice-president; Charles D. Walcott, second vice-president; Ralph P. Barnard, secretary; Isaac R. Hitt, Jr., assistant secretary; Charles E. Munroe, treasurer; Isaac H. Saunders, assistant treasurer;

Gifford Pinchot, librarian; Edwin H. Fowler (deceased), Wallace D. McLean, Henry A. Pressey, George O. Totten, Jr.

Provisions will be made at the University Club for accommodating the various alumni associations during meetings, smokers or banquets. Until such arrangements are completed, our society will hold its meetings in the "Octagon House," an historic mansion which was used as the Executive mansion for a long period subsequent to the burning of the old White House during the War of 1812.

One of the noticeable features in connection with civil service examinations for federal appointments is the number of Tech graduates who are successful, especially in the engineering branches. During the organization of the Reclamation Service, to which have been intrusted the planning and construction of the great irrigation systems of the West, the proportion of successful competitors from Tech in comparison with other schools has at times been extraordinary. At a recent examination the first, second, and third places upon the roll fell to Institute men. The chief engineer of this great corps is F. H. Newell, '84.

Mr. Gerard H. Matthes, '95, of the United States Geological Survey, now stationed in Oklahoma as district engineer in charge of irrigation surveys and other government construction, was married on March 3 to Miss Mary M. Bewick.

At a meeting of the society, to be held on March 23, it is proposed to take final action with reference to the society's participation in the June reunion. The list of visitors cannot be completed until a later date because of the fact that so many of the Washington men are subject to departmental assignments in the field during the spring, summer, and fall seasons, which may interfere with any reunion plans. Until such definite assignments are made, the matter is left in doubt.

MARSHALL O. LEIGHTON, '96, *Secretary*,
U. S. Geol. Survey, Washington, D.C.

THE TECHNOLOGY CLUB OF CINCINNATI

The annual banquet of the Club was held at the Queen City Club, Thursday, February 25. Twenty-one members and Dean Burton were present. Great interest was taken in Professor Burton's talk; and Mr. Stanwood, the new president, gave an address on more efficient methods in teaching modern languages and mathematics and upon the desirability of instructors being men who had had actual engineering practice. The project of the North-western Association for a trip to Boston in June this year, the one hundredth anniversary of President Rogers's birth, was enthusiastically received, and Cincinnati will send on a good delegation.

It was decided to have the lunches every Tuesday in place of only once a month.

The following officers for the year were chosen: president, James B. Stanwood; vice-president, Charles G. Merrell; secretary, A. H. Pugh, Jr.

Those present were W. C. Brotherton, E. C. Carpenter, C. B. Clark, Thomas Evans, Joseph W. Ellms, W. F. Helwick, D. G. Hemingray, S. A. Hooker, G. W. Kittredge, C. P. Mulherin, A. S. More, J. S. Neave, A. H. Pugh, R. W. Proctor, G. W. Stearns, James B. Stanwood, R. S. Shohl, Rudolph Tietig; also Messrs. Hildabolt and W. B. Poland from out of town.

ACHILLES PUGH, JR., '97, *Secretary*,
1912 Madison Ave., Cincinnati, Ohio.

THE TECHNOLOGY CLUB OF THE MERRIMACK VALLEY

The annual meeting of the Technology Club of the Merrimack Valley was held at the Essex House Friday, February 5. There were nineteen members present, President F. H. Silsbee presiding. A new constitution was adopted to conform with the general usage in such organizations. The following officers were elected: president, Earle B. Phelps, Lawrence; vice-president, Linwood O. Towne, Haverhill; secretary, John A. Collins, Jr., Lawrence;

treasurer, W. O. Hildreth, Lowell; member of the Executive Committee, George Bowers, Lowell.

The organization embraces the various cities and towns along the Merrimack Valley, and at present has about fifty members.

John Alden, chemist of the Pacific Mill, read the paper of the evening on coal-tar products, giving an interesting account of the various aniline colors and other products obtained, and the frequent discovery of new uses for the products, particularly in the pharmaceutical field.

The meeting adjourned to the Essex House café, where a light lunch was provided. Among the members present were William P. Atwood, chemist of Hamilton Print Works, Lowell; George H. Nelson, assistant city engineer, Lowell; Mr. White and Mr. Rhodes, of Andover; Ralph Ingram, Winfred A. Taylor, Allyn C. Taylor, Fred M. Palmer, G. A. Fairfield, Herman J. Cass, R. A. Hale, Ivar L. Sjöström, John A. Collins, Jr., W. O. Hildreth, John Donovan, G. Wilmer Hathorne, James Barlow.

The club held its monthly meeting at the residence of Mr. Ivar Sjöström, Lawrence, on Tuesday evening, March 29. Among those present were Messrs. Atwood, Bowers, Nelson, and Hildreth, of Lowell; Messrs. Silsbee, Russell, Phelps, Hamblet, Hale, W. Sjöström, and Cass, of Lawrence, and Mr. Bowen, of Boston. Mr. William S. Whitney, supervising engineer of the American Woolen Company, read a paper on "Steam Turbines," outlining the principal types, and giving their efficiency as compared with reciprocating engines.

It was the voice of the meeting that in some way to be later determined the club should be represented at the proposed Commencement Reunion.

At the close of the meeting the members were entertained at lunch by Mr. and Mrs. Sjöström.

JOHN A. COLLINS, JR., '97, *Secretary*,
79 Tremont Street, Lawrence, Mass.

TECHNOLOGY MEN OF MONTANA

The following is from Institute men residing in Great Falls, Butte, and Anaconda, Mont.:—

The discussion now going on relative to the consolidation of the Massachusetts Institute of Technology with Harvard University leads us to offer the following reasons for opposing the plan:—

1. Starting with the assumption that such a merging of the two institutions would not keep alive both names, we take it that the name of the older would be retained and the identity of our school, which we shall always think of with great pride, will be lost. And, even if a combination of names should be adopted, the individual reputation and prestige of Tech will disappear.

2. The different purposes and ideals of students—some wishing to take a strictly scientific or engineering course, and others who look forward to careers in which they will need only technical knowledge of a general character—will not be carried out.

3. Classes would be too large for thorough work, and for the professors and instructors to become acquainted with each student. The lack of personal help and encouragement has led students to abandon their intention of completing regular courses, even with classes no larger than they are now at the Institute.

Moving to a new location is another matter, and can only be decided by those who are familiar with all the surrounding conditions of present and proposed sites.

J. C. ADAMS.	W. W. GARRETT, '01.
C. H. BURR, '02.	C. W. GOODALE, '75.
D. C. CAMPBELL, '98.	WARREN JENNEY, '94.
G. W. CRAVEN, '98.	P. D. KEHEW, '03.
W. S. CRAVEN, '03.	ROBERT P. ROBERTS, '00.
CHARLES D. DEMOND, '93.	F. W. SNOW, '00.
R. M. DRAPER, '98.	A. E. WHEELER, '95.

THE ASSOCIATION OF THE WOMEN OF THE M. I. T.

The fourth annual meeting of the Association was held at the Margaret Cheney Reading-room on Saturday, Jan. 2, 1904. A driving snow-storm prevented a large attendance, but about thirty members were present, together with a few guests, among whom

were Professor J. M. Crafts, Dean A. E. Burton, Professor H. W. Tyler, and Mr. and Mrs. C. F. F. Campbell.

The meeting was called to order by the vice-president, Miss Kenney, since the president, Mrs. Richards, was unable to be present. At the business meeting, reports of the various officers were heard, and officers for the ensuing year elected as follows: president, Mrs. E. H. Richards; vice-presidents, Miss C. B. Kenney, Miss M. A. Molineaux; recording secretary, Miss M. E. Dodd; corresponding secretary, Miss Ava Stoddard; auditor, Miss E. E. Torrey; other members of the Executive Committee, Miss Ava Stoddard, Miss L. B. White, Miss Alice Burr.

Luncheon followed, after which the meeting adjourned to a room in the Architectural Department, where Mr. Campbell gave a very interesting cinematograph and stereopticon lecture on "Seeing by Touch, or How the Blind become Self-supporting."

The association has had a busy and useful year. Four social afternoon meetings have been held, at each of which some important subject has been discussed or some interesting speaker heard. At one meeting President and Mrs. Pritchett were the guests of the association. The association was asked to assist the Hospitality Committee at the meeting of the National Educational Convention last July, and many members reported for duty at Rogers Building during that week. In October the association were asked to assist the Public School Association in its efforts to secure a better school committee for the city of Boston, and many Institute women did all they could to further this cause.

The Registration Committee has issued a little booklet in covers of Technology gray and red, which contains lists of members and officers of the association, the constitution, and the year's programme.

A Gymnasium Committee has been appointed to care for the needs of the women students in gymnasium work. Some years ago a small room adjoining the Margaret Cheney Room was reserved for a gymnasium for the women, and it was furnished by a bequest of the late Miss Hovey. By the aid of interested friends and with the cordial indorsement of the Institute authorities a

teacher has been engaged by the association, who comes every day at noon to give a short drill in light gymnastics here. The work seems to be successful, and the association hope that it will prove sufficiently useful to warrant its continuance in future years.

MARGARET E. DODD, '92, *Secretary*,
Norfolk House, Roxbury, Mass.

ASSOCIATION OF CLASS SECRETARIES OF THE M. I. T.

A special meeting of the Association was held at the Technology Club on Thursday evening, Jan. 21, 1904. It was called to order at 8.10 o'clock, and Professor R. H. Richards, '68, was chosen chairman.

The Executive Committee of the Alumni Association was invited to attend the meeting, and a majority of this committee was present. The total attendance was thirty-two.

The business of the meeting was to take action upon the proposed reunion of alumni at commencement next June. The Committee on Alumni Observance of Commencement, appointed at the last meeting, made its report, which was accepted. The sentiment of the meeting was heartily in favor of holding the reunion, and after considerable discussion as to the manner of carrying out the undertaking the following votes were passed unanimously : —

Voted, That the Executive Committee of the Alumni Association be asked to undertake an alumni reunion in June, and to associate with itself a committee of this Association to act as a general committee to take charge of all arrangements ; and we request that this general committee invite the Faculty and Technology Club and such other bodies as it may deem desirable to appoint representatives to act upon the general committee.

Voted, That this Association be represented upon the general committee for the alumni reunion by the committee appointed Nov. 19, 1903, namely :

The president of the Technology Club.

The secretary of the Faculty.

The secretary of the Alumni Association.

The secretary of the Association of Class Secretaries.

The secretary (or representative) of the North-western Association.

Dr. Tyler, chairman of the Committee on Vital Statistics, reported that, owing to the death in November, 1903, of Dr. George B. Englemann, who was to make use of the information collected by this committee, it had decided to do nothing at present in the matter of collecting information of marriages and offspring of former Technology men.

The meeting adjourned at 9.45 o'clock.

FREDERIC H. FAY, '93, *Secretary*,
60 City Hall, Boston.

THE TECHNOLOGY CLUB

It seemed evident by the number who attended the sixth evening of the season, Tuesday, January 5, that a great deal of interest was created by the notice of Mr. W. C — ky., known as "John Baker," who was to give a talk on this evening. The interest was maintained throughout the evening, and after the talk questions were asked and the discussion continued until a late hour. Mr. Baker's talk was on "A Trip toward Siberia as a Political Exile; his Escape; Prison Life in a Russian Dungeon; Church Government; Police and Espionage System; Education and College Life in Russia." On the seventh evening of the season, Tuesday, January 26, and a Ladies' Night, Mr. Lyman Underwood, so well known to the members of the club, gave a talk on "The Strange History of a Black Bear's Cub: A Story of the North Woods." A charming bear story, which may be told to the children at bed-time, was enjoyed and appreciated by their elders. Mr. Walter H. Page, editor of the *World's Work* and former editor of the *Atlantic Monthly*, on the eighth evening of the season, Tuesday, February 16, gave a confidential talk on the management of magazines. Mr. Page's talk was illuminated by many interesting anecdotes and reminiscences. The ninth evening, Tuesday, March 8, was another Ladies' Night, and Mr. LeRue Vredenburg gave recitations, some of which were in the French-Canadian dialect. Mr. Vredenburg's talk pleased the many club members and their friends. Mrs. Jessie Downer Eaton

assisted Mr. Vredenburg, and played most delightfully. On the tenth evening, March 29, a popular lecture on "Radium" was given by Professor George V. Wendell. Professor Wendell did not have to be introduced to the club members. He took the members back to the time of their second-year physics, and gave a most instructive and clear demonstration of the properties of radium. On this night there was the largest audience of any smoke talk in the club's history, over one hundred and sixty being present. Immediately following Dr. Wendell's paper Dr. F. H. Williams spoke of the physiological effects of radium. The evening's talk was illustrated experimentally.

On Feb. 8, 1904, a quorum being present, it was voted, with only one dissenting voice, that the following proposed changes in the by-laws of the club, said proposed changes having been submitted in print to all the members more than one week before the date of the meeting, be adopted:—

That Article XII., Section 2, paragraphs 1 and 2, of the By-laws be so amended as to read: "Sect. 2. The annual dues for resident members shall be twenty dollars; for non-resident members, six dollars; for undergraduate members, ten dollars.

"All dues shall be payable semi-annually in advance, upon the first day of October and of April."

It is a matter of regret that the dues could not be kept at the extraordinarily low figure of \$15 per year; but, while to maintain them at that point would perhaps enable the club to pay its current expenses, it would not provide for the liquidation of the bonded indebtedness or make provision for the day when the club, as seems probable, will be compelled to enlarge its facilities. As an annual fee of \$20 is less than half that charged by most, if not all, similar clubs in the city, as the Technology Club is plainly doing a valuable service to the Institute and to Institute men, and as the scope of its usefulness is every year enlarging, it is hoped that no member will give up his connection with the club because of the increased fee.

Mr. Thornton K. Lothrop, of the Corporation of the Institute,

has recently presented to the club his five Technology Club bonds, with the coupons still uncut. His generous gift is highly appreciated.

WALTER HUMPHREYS, *Secretary*,
83 Newbury Street.

COMMUNICATION

I wish to offer a suggestion regarding the English course at the Institute, which I would like to have put before the alumni, in order to see if their idea is the same as my own.

In brief, I suggest that the English Department take up, early in the Freshman year, the development of a card cataloguing scheme, which every student be required to keep, using it to make a record of his books, papers, and work; the department to have this catalogue—in part or as a whole—turned in at intervals, to see how completely it is kept. From the inspection the department can find out what the student is most interested in, and can find material upon which he should be required to write frequent themes.

This will serve a double purpose, showing the student how to keep run of his material and how to use it in a methodical way.

The English course will not suffer, as its idea is to train the student in the use of good English. How could it be better done than by giving him the chance to write on a subject which is of interest to him, and at the same time training him to look up, formulate, and put into a theme a connected and accurate account of what his records show?

This will also stimulate his imagination and enable him, by practice, to extract the truth from what his data give him.

HENRY D. JACKSON, '97.

NEWS FROM THE CLASSES

1868.

PROF. ROBERT H. RICHARDS, *Sec.*, Mass. Inst. of Technology.

An idea was developed in December, 1902, that since the classes of '68, '69, and '70 are small in number, and since the members were much drawn together as comrades, why might they not have a joint dinner. Members within reasonable distance were invited. Twenty-two accepted and came to the dinner, thirty-two regretted that they were unable to be present, in many cases because of the evening, which they had retained for their family festivities. The men who accepted and came were Eli Forbes, Albert F. Hall, Robert H. Richards, Joseph Stone, William Jackson, C. Tennant Lee, William E. Stone, Eben S. Stevens, J. Raynor Edmands, Channing Whitaker, Ernest W. Bowditch, Charles B. Fillebrown, Charles R. Cross, Charles W. Hinman, Edward M. Buckingham, Frederic Brooks, Christel Orvis, Charles H. Sprague, Robert F. Fisk, Charles T. Hemenway, George T. Tilden, Walter Whittlesey. Those who regretted were James P. Tolman, Whitney Conant, Charles E. Greene, William E. Hoyt, Walter H. Sears, Bryant P. Tilden, Stuart M. Buck, John B. Dunklee, Josiah L. Chapin, Elisha P. Cutler, Robert S. Peabody, Miles Standish, Samuel S. C. Williams, William H. Baker, Howard A. Carson, Joseph W. Revere, Eugene L. Tebbets, Walter T. Willey, Theodore F. Tillinghast, N. Frederick Merrill, Frederic Amory, Eliot C. Clarke, William N. Bannard, William H. Bixby, Samuel Cabot, Samuel S. Gray, George R. Hardy, William T. Henry, James L. Hillard, Edw. Renouf, James B. Russell, J. Malcolm Forbes, Winchester Veazie. A very delightful meeting of old comrades resulted. Many old time incidents were reviewed, old teachers were talked over from both points of view, the abundance of their wisdom and the lack of it. Sam Cabot remembered only the game of baseball when the

class of '70 hit the balls of Richards, '68, all over the ground, and made a great score against their adversaries. Richards recalled the game of baseball when he was pitcher and Chapin was



catcher, and Tech played the Lowell Club and gave them a sound drubbing. A strong feeling for Alma Mater was shown on all sides throughout the evening, whether the members had taken the whole course and graduated or had stopped with less. Letters from many absentees were read, calling up the good old times.

B. P. Tilden said, "At 6.30 P.M., Eastern time, on December 24, after an appropriate grace, I will stand up in a row all by myself, and solemnly pledge the boys who may be present with you and also those who may be absent. My love and best wishes to all of them." The following letter from Professor Storer was also read; and, in discussion of it, remarks were made on all hands, showing what a strong force Professor Storer was in the early work of the school, not only as a teacher, but as an organizer.

Dear Richards,—You are very kind, and so are the classmates whose sentiments you set forth. I know thus much, for I feel just that way towards you and towards them. But, for reasons many and various, I cannot accept the invitation. I beg you will assure those pioneers—now grown to be something very like veterans—that I hold them all in high esteem.

Even as the good die young, so friendships choked off, but not strangled in their prime, endure forever. The memory of them remains uncontaminated by the stress of conflicting interests which arise in the course of life, or by jealousies, by slights, real or supposed, or by the "mud at the bottom of the eye" that Mr. Emerson told of, which becomes so much more plainly and painfully visible when the enthusiasms of youth are past.

I wish you would assure the class that few men know better than myself how good a fight it has made. There is no exaggeration in the thought that through the influence of this particular class the country (bad as it is) is a better country than might have been.

I hold that there would have been little use in bending the twig—no matter how wisely—if the timber in it hadn't been sound and firm and wholesome enough to incline the tree as we see it now.

The crowning feature of the evening was the presentation of a silver loving-cup with this inscription:—

ROBERT HALLOWELL RICHARDS

FROM TECHNOLOGY SCHOOLMATES

DECEMBER 24, 1902,

with suitable remarks by Eben Stevens and Joe Stone, both of '68. Richards was unable to express his sentiments at the time. The following letter is what he would have said if he could have:—

My dear Friends,—This is the most beautiful cup I ever saw. The symmetry of its design is simply perfect. You have given it to me who you think is a good fellow and deserves it. Would that this were all so!

I accept the cup with my sincerest thanks. I will keep it as a reminder of your kind thoughts and as an incentive to aim to be the good fellow you have done me the honor to think me.

Cordially yours,

ROBERT H. RICHARDS.

1869.

HOWARD B. CARSON, *Sec.*, 20 Beacon Street Boston.

J. Malcolm Forbes died at his home on Milton Hill, Milton, February 19. He was a member of a family long identified with large American interests on land and on sea. After leaving school, he associated himself with his father, John M. Forbes, and assisted in the management of the large East Indian shipping business which the former had built up. He was instrumental, also, in the development of the Michigan Central and C., B. & Q. Railroads. Later on he was among the earliest to see the possibilities of another great enterprise, the Bell Telephone Company. Mr. Forbes was a member of the firm of John M. Forbes & Co. at the time of his death. Upon the death of Henry L. Pierce, his firm bought the controlling interest in the Walter Baker Chocolate Company of Milton and since then Mr. Forbes devoted considerable energy to the development and expansion of its business. His interest in yachting dated back to his boyhood, and is particularly remembered in connection with the international yacht race of 1885, when the "Puritan" defeated the "Genesta." In fine horses, too, he was greatly interested, and among his prizes were Nancy Hanks and Arion. He was born in Milton in 1847, the son of John M. and Sarah Swain (Hathaway) Forbes. His elder brother, Colonel William H. Forbes, for many years president of the Bell Telephone Company and a member of the Corporation of the Institute, died in October, 1897. Mr. Forbes was twice married. His first wife was a daughter of E. C. Jones, of New Bedford. His second wife was Miss Rose Dabney, of Fayal, who survives him, as do six

children. In addition to his beautiful home at Milton, Mr. Forbes owned the island of Naushon on Vineyard Sound, and here he had a summer place at which he spent a considerable portion of each year. He was a member of the Country Club, the B. A. A., and the Mercantile Library Association. Mr. Forbes took a deep interest in politics, and was a warm admirer of the late Governor Russell. In 1895 he was elected to the House of Representatives from Milton as a Democrat; but political life was not entirely congenial, and he declined a renomination.

1870.

PROF. CHARLES R. CROSS, *Sec.*, Mass. Institute of Technology.

From the Nevada State *Journal* of March 31, 1904:—

L. F. J. Wrinkle, a mining man of prominence of Thebe, Inyo County, was found dead yesterday in his room at San Francisco Hotel. It is believed that death resulted from natural causes. He was about sixty-five years of age, and leaves a widow and five children. The deceased was one of the most successful mining engineers of Nevada, and his work in the State dates from the pioneer days.

Professor Wrinkle graduated from the Massachusetts Institute of Technology in 1870, and shortly afterwards came to Nevada. He travelled over the State for a time, and later accepted a position as engineer for James & Strait of Virginia City. After being in their employ for a short time, he succeeded the firm, and went in business for himself. His successful operation in the famous camp soon placed his name among the most noted mining men of the United States, and his business was confined solely to expert work.

His knowledge of mining attracted the heads of the mining school of the University of Nevada, and Sept. 1, 1900, he was induced to accept a chair. He served in the capacity of professor of mining engineering until May 30, 1903, when he resigned to again take up active work. During the time he was connected with the institution he won the esteem of faculty and students alike, and it was with regrets that he left the university.

Professor Wrinkle was largely interested in mining enterprises of Southern Nevada, and his wise counsel will be missed among promoters of that section. But a few days ago he passed through Reno *en route* to the coast, and at that time appeared to be in the best of health.

1875.

E. A. W. HAMMATT, *Sec.*, 10 Neponset Block, Hyde Park, Mass.

The twenty-second annual meeting and dinner of the class were held on the evening of Friday, March 11, 1904, at the Hotel Miesusset, Boston. There were present President Thomas Hibbard and Messrs. Thomas Aspinwall, B. Leighton Beal, George Bowers, Edgar S. Dorr, Samuel J. Mixter, William H. Ruddick, and William P. Willard. The evening was one of the most enjoyable of the many that this little band has had together, but its full pleasure was marred by the absence of the faithful secretary of the class, E. A. W. Hammatt. It was the first time since the class has held meetings that he has failed to cheer the members with his quaint reports, his bits of class gossip, and his cheerful countenance. His absence was due to a recent affliction in his family, of which the boys took due notice in a little note to him, which will convince him, if he needed convincing, of the warm place which he holds in their affections. Of necessity the usual reports as to finances and class history were not available. There never is any formality at these gatherings, and this meeting was no exception to the custom. The only serious trouble arose at the election of officers. Then a most astonishing state of affairs was revealed. By their own admission the old board of officers had been fattening for years on the rich pickings and stealings which one would expect to find in an organization of this kind; and, more astonishing still, they were most anxious to abandon their harvest, and give some other fellow a chance. But the class would none of it, and these gentlemen were condemned to penal servitude for another year: president, Thomas Hibbard; vice-president, B. Leighton Beal; secretary and treasurer, E. A. W. Hammatt; executive committee, Messrs. Beal, C. H. Williams, Samuel J. Mixter.

B. L. BEAL, *Secretary pro tem.*

1876.

JOHN R. FREEMAN, *Sec.*, 145 Morris Avenue, Providence, R.I.

The following clipping is from the Boston *Journal* of Feb. 12, 1904:—

Among the well-known Americans at Chemulpo is W. D. Townsend, brother of E. B. Townsend, of Brookline, and a former well-known civil engineer of this city.

Mr. Townsend has been a resident of the Far East for the past twenty years, going to Japan shortly after his graduation from the Massachusetts Institute of Technology. Mr. Townsend was considered one of the best civil engineers graduated from that institution, and during the first part of his stay in Japan was connected with government railroad work.

After several years spent with the Japanese, where he married a young Japanese woman, he removed to Chemulpo, where he now lives. Here he went into mercantile life, associating himself with a Mr. Deshler, of New York. The firm continued for a number of years, when it was dissolved, Mr. Townsend continuing the business alone.

His brother, E. B. Townsend, of Boston and Brookline, visited Chemulpo three years ago, spending several months with his brother. Since his return he has been in constant receipt of letters from the East, dealing with the situation in that section.

1877.

RICHARD A. HALE, *Sec.*, Haverhill, Mass.

The annual dinner and reunion of the class was held February 23, at 6.30 P.M., at the Technology Club. There were fifteen members present. President Frank E. Peabody was in the chair. The members present were Alden, Fairbanks, Clarke, Davis, Nelson, Sherman, Gowing, Taber, F. E. Peabody, Plimpton, Jenney, Hale, Southworth, Spalding, Williston. A discussion ensued in regard to the change of the annual meeting to June, as suggested at the meeting of class secretaries; and it was voted to have a reunion in June at Commencement time. Alden and the secretary were appointed a committee to make necessary arrangements. It was the general opinion of the members present

that the midwinter meeting should be maintained, owing to a long established custom and to the fact that some Western members were more likely to be at home in the East during the winter than at any other time. Several letters were received indorsing the June reunion plan. It was voted as the sense of those present at the meeting that it was undesirable that any alliance should be made by the Massachusetts Institute of Technology with Harvard University. Among those present who were not regular attendants were Taber, who is engaged in railroad location in the West, and is now spending a few months at his former home in New Bedford, and Edward W. Davis, formerly of the Hallett & Davis Piano Company, and more recently of the Puritan Press, Boston. The meeting adjourned subject to the call of the executive committee in June. On February 12 the secretary sent out a circular regarding the June reunion.

1881.

FRANK E. CAME, *Sec.*, 17 Place d'Armes Hill, Montreal, P.Q.

Mr. Charles M. Wilkes has been elected vice-president of the North-western Alumni Association.—“Bill” Revere is superintendent of the National Wool and Leather Company at Salem, and is doing very well.

1882.

WALTER B. SNOW, *Sec.*, Russell Avenue, Watertown, Mass.

The twenty-second anniversary dinner was celebrated at the Technology Club on Thursday evening, February 4. Darrow, Gerry, Gooding, Herrick, Jenkins, Munroe, W. B. Snow, Strickland, A. W. Walker, Warren, and Wood were in attendance. Strickland, who is with the Union Iron Works of Bangor, and Wood, who is of the firm of William Wood & Co., Philadelphia, met the members of the class for the first time since 1879.—J. H. Ross has since reported himself as “off the Fastnet, coast of Ireland on the 4th” of February.—Manning has severed his connection with the Washington Foundry and Machine Company

of Washington, Pa., and is now associated with the Wheeler Condenser and Engineering Company of Chicago.—Hall's address is now Peterboro, N.H.—Mansfield is now located at Westerly, R.I., and is interested in the Pawcatuck Street Railway Company, the Westerly and Hopkinton Railway Company, and the Westerly Gas and Electric Light Company.—The class is represented upon the TECHNOLOGY REVIEW Committee by Munroe and Snow.

1884.

PROF. WILLIAM L. PUFFER, *Sec.*, Mass. Inst. of Technology.

The annual dinner was held February 23 at the Technology Club, and was attended by Coburn, Dearborn, Gill, Hammett, Puffer, and Tyler. Mellen dropped in during the evening. Letters were received from C. S. Robinson, F. F. Johnson, H. A. Boardman, George F. Jarvis, William J. Rich, A. L. Rotch, T. C. DuPont, C. B. Appleton. William M. Whitney telegraphed his good wishes from Riverside, Cal.—H. F. Baldwin has resigned his office of chief engineer of the Chicago & Alton Railroad to become vice-president and general manager of a DuPont Powder Company, with his office in Philadelphia.—Rotch has been appointed chairman of the section of Meteorology at the International Congress of Arts and Sciences at St. Louis. He is also on the consulting board concerning the Aeronautical Course.—Rotch, Mellen, and Puffer were appointed a committee to attend to the class gathering in June, and they propose to get as many of the class together as possible for a good time on the twentieth anniversary of our graduation. Think of it, boys, twenty years since we graduated! The secretary wants all the information he can get for the new class directory.

1887.

EDWARD G. THOMAS, *Sec.*, 4 State Street, Boston, Mass.

Guy Kirkham is now a member of the firm of Kirkham & Parlett, architects, with offices in the Carr Building, 25 Harrison

Avenue, Springfield, Mass.—N. S. Sparhawk reports the birth of a second daughter.—A. O. Elzner reports that his firm, Elzner & Anderson, have just completed the first concrete sky-scraper in the world, the Ingalls Building in Cincinnati, constructed entirely of concrete-steel for all structural work throughout.—G. W. Morrison is now engineer for the Power and Mining Machinery Company, 52 William Street, N.Y. He is just now at Velardeña, Durango, Mexico, supervising the installation of a large gas engine and electric plant for power distribution throughout the entire properties of the Velardeña Mining and Smelting Company.—H. W. Kimball is now connected with the Fulton Bag and Cotton Mills at Atlanta, Ga.—C. P. Smith reports that he is now engineer of works of the Westinghouse Foundry Company at Trafford City, Stewart Station, Pa.—B. C. Lane is serving his second year as president of the West Roxbury Citizens' Association.—C. L. Holmes is receiving congratulations on the birth of his first son, born on February 6.—W. H. Brainerd's firm, Brainerd, Beeds & Russell, architects of Boston, have been awarded in competition two important buildings, the Ford Memorial Building for the Baptist Union and the Congregational church at West Medford.—Granger Whitney reports that he is "back in the tall pine timber," as superintendent of the Muscadine Mining Company at Iron City, Ala.—J. W. Stearns is resident engineer of the Cleveland, Cincinnati, Chicago & St. Louis Railway, with present quarters in camp in Kennedy, Ind.—Spaulding is now connected with the Hutchison Acoustic Company, and has opened an office for them in Washington in the Colorado Building. He will have charge of their entire plant at their exhibit at St. Louis, and hopes that all will call upon him when they go to the show. His permanent address is care of the Company, Astor Court Building, New York City.—Business in Los Angeles is rushing, if every one is as busy as is Farwell, who writes as follows:—

Doing well, nothing to kick at,—good health and a good wife, and saving more than when single. We have our share of big work, all we can swing. Merchants' Trust Building, nine stories, 75 by 150, fire-proof, steel, brick, and terra-cotta; Morosco Hotel and theatre, 80 by 360, fire-proof, nine

stories; one six-story hotel and another of seven stories for the Salvation Army; the Occidental College,—Hall of Letters; three city schools; Carnegie Library; county jail; many business blocks and residences.

—Souther was commissioned by parties financially interested in the wreck of the Darlington Building, New York, to examine the ruins and report on the material used; and, as the ruins were guarded by the police, he was obliged to gain access through an adjoining hotel. After concluding his investigations and showing himself to the police, they were in doubt for some time as to whether it would not be well to put him under arrest as a trespasser.—Gelett Burgess recently had the honor and pleasure of taking lunch with President Roosevelt at the White House.—The annual dinner of the class was held at Young's Hotel, February 27, the following seventeen men being present: Taintor, Lane, Bullard, Tripp, Hussey, H. S. Adams, H. D. Sears, Cameron, Draper, Souther, E. G. Thomas, Gulliver, Young, Coburn, F. A. Kimball, W. H. Brainerd, and Fish. As none of the Trustees of the Class Fund were able to be present, they reported by letter that they had recently been called upon to assist an urgent case of need of one of the members; and, since the income of the fund, which alone can be expended by the trustees was insufficient, they asked that subscriptions be made to the Income Fund, in order that their assistance might be continued; and a considerable sum was subscribed by the men present. The officers of the class were appointed to take charge of class affairs in connection with the coming Technology Reunion in June, and the following were elected officers for the coming year: president, J. A. Cameron; vice-presidents, H. D. Sears, T. W. Sprague. A great deal of interest was excited by the presentation by Taintor of very interesting charts and data on the progress of scientific education in the neighborhood of Boston, showing the way in which the total number of students receiving education in technical training has increased until it now exceeds that receiving academic training in the institutions under consideration. The discussion which followed was largely on the advisability and possibility of increasing the resources of the Institute by affiliation with a more heavily endowed institution; and, while many

opinions in both directions were expressed, it was evidently the sentiment of all that the independence of the Institute and the character of its training and the value of its degree should be preserved without chance of loss.—E. G. Thomas, in association with H. C. Forbes, '91, is engaged in the engineering work of the Rockland, South Thomaston & Owl's Head Railway at Rockland, Me.—J. E. Freeman recently sailed for a vacation trip in Europe.—G. O. Draper has published a very interesting account of a summer trip in Europe, entitled "Still on the Search, in Funchal, Granada, Algiers, Monte Carlo, Cairo, Jerusalem, Constantinople, Athens, Sicily, Italy, Switzerland, and Paris." Aside from his very entertaining account of some of the incidents of the trip and keen comment on the people and interesting features of these countries, the book is of especial interest because of about fifty illustrations made from drawings by the author.—W. S. Hadaway, Jr., of the Hadaway Electric Heating and Engineering Company, sent out notices in February of their removal to 136 Liberty Street, Room 322, New York, N.Y., in order to secure increased facilities.—Davenport's new position as third vice-president of the Niagara Falls Power Company, as well as his past work, is thus pleasantly outlined in a recent *Electrical World*:—

Mr. George W. Davenport, whose portrait is presented herewith, has, as noted in these columns, been elected recently third vice-president of the Niagara Falls Power Company, that office having been created quite recently. The appointment took effect on January 1, and Mr. Davenport is now in residence at Niagara Falls, where he will perform the duties assigned to him by the second vice-president, whom he will assist, Mr. Rankine finding that the constantly increasing business of the Niagara Falls Power Company and its allied concerns demands attention from a man of Mr. Davenport's scope of experience, energy, and ability. Mr. Davenport, after a course in the Massachusetts Institute of Technology and factory experience with the Thomson-Houston Electric Company at Lynn, Mass., became general manager of the Thomson-Houston International Company, and for eight years was connected with that company and the General Electric Company. When the General Electric Company in 1893 turned over to a board of trustees, known as the trustees of Street Railway and Illuminating Properties, over ten millions of securities of various electric lighting and railway companies

situated in different parts of the United States, Mr. Davenport became assistant to the trustees, and had a varied experience in the examination, operation, and management of many of the 136 properties in which the trustees were interested. He has recently been second vice-president of the Planters' Compress Company, whose head office is in Boston. As an associate of Mr. C. A. Coffin in the old Thomson-Houston days, and latterly as an expert and manager in connection with electric light and power properties, Mr. Davenport has made a great success, being also one of the most widely known men in the central station field. He is a man of marked personality, charming manners, and is not only conversant with affairs, but a deeply read student, one of his hobbies being the collection of old books and early electrical literature. His new appointment gives much pleasure to a host of friends who have watched his career with interest.

—The following is cut from the Concord (N.H.) news items of the Manchester *Union* of Jan. 29, 1904:—

John Henry Couch, one of the best known young men of Concord, died to-day in Portland, Ore., after a protracted illness, with tuberculosis. The many friends and immediate relatives were apprised of his death this afternoon, and, while expected, it was a severe blow to many, and occasioned universal regret.

Mr. Couch was the son of Benjamin W. and Susan (Woodward) Couch, and was born in Windsor, Vt., in 1865. Almost his entire life, however, was spent in this city. He was educated in the public schools of Concord, and was a graduate of the Massachusetts Institute of Technology at Boston. For eighteen years he was employed at the First National Bank in this city. Two years ago he developed symptoms of tuberculosis, and last winter he passed the time at the Pembroke Sanatorium. This spring he went to Portland, hoping that the change of climate would prove advantageous to his declining health.

In 1890 he was married to Mary H. Woodward, of Portland, Ore., who survives, with one son. A brother, Benjamin W., and a sister, Mrs. Susan C. Badger, of Mobile, Ala., also survive.

—H. F. Bryant writes interestingly of a winter vacation trip:—

Left Boston February 26 with Mrs. Bryant and my son, taking passage on United Fruit Company steamer "Preston," with about twenty others. The steamer was six days late in sailing, and had all its heating pipes frozen up. Passage was uneventful, lasting five and one-half days on what, for the

route taken, was a smooth sea. Forty-eight hours brought us to moderate weather in the Gulf Stream, and, when off Cuba, all hands were glad to appear in thin clothing and keep in the shade.

We found Jamaica decidedly tropical, where all wise people, not natives, kept indoors between eleven and three. Was particularly impressed with the cleanly character of the vegetation, which, in spite of the heavy rainfall on the north shore, does not produce a damp or swampy condition. The air is clear, with but little dust, and at this season there are almost no flies or mosquitoes. Big spiders, beetles, and roaches are everywhere, causing considerable nervousness among the ladies. I am informed that there are no snakes whatever upon the island, they having been exterminated by the mongoose, which, in turn, fell a victim to the tick. The scenery is always green over the entire island, and is very abrupt and picturesque. The mountains rise over seven thousand feet above the sea, and are of volcanic origin, and can be climbed in almost any direction. My ambition was to climb the highest peak, but lack of time prevented. I might say also that a certain "tired feeling," due to the climate, may have been partially responsible. The island is practically in the possession of the United Fruit Company, which has enormous banana plantations and with the few native plantations constitute the chief and to-day almost the sole industry of the island. Some five months ago the entire territory was swept by a hurricane, and every banana tree, almost without exception, was laid flat. Already the trees have grown from twelve to twenty feet in height, and will bear another crop in another month. Meanwhile all bananas are obtained from Central America, where similar plantations exist. The roads are all macadamized and kept in splendid order by the English government, and to any automobilist this is a winter paradise. Transportation to and from the island for both freight and passengers is comparatively inexpensive; and, as one can select his own climate by choosing his resting-point, it is an ideal place for a winter rest. The population is almost entirely black, with some Hindoos; and one thing was particularly noticeable, that with all the abundant children there was not a single cry to be heard, nothing but smiles from both young and old. It is a happy hunting-ground for the native. It requires but little effort for him to exist. He has no political duties, unless he is a property-owner; and he is lightly taxed. The larger part of the work, particularly the heavy work, is done by the women, the suffragists not having invaded that territory.

On March 12 we took the steamer "Benito Estenger" from Port Antonio to Santiago, a twelve-hour run on smooth seas under summer skies. The ship was a tub, dirty and slow; and her crew were Spanish and

Cubans. We arrived in Santiago Sunday afternoon, and, after making special arrangements with the custom-house to get away early in the morning, took a ride through the city, seeing all the pretty women, both married and single, sitting in their barred windows receiving friends and possibly strangers. Santiago bears every mark of the American in its streets, in its hotels and transportation methods. There seems to be but little business now, and Americans are scarce. We ate the finest American dinner at the Casa Grande that we had had since leaving Boston.

Took train at six o'clock Monday morning for Havana, a twenty-five-hours' ride, a distance of something over five hundred miles. After getting, say, one hundred miles beyond Santiago, there is little to be seen but flat, level areas, some of which are growing crops, but in more of which cultivation has been abandoned. The old line of Spanish blockhouses on one of the trochas is still visible. The sleeping-car accommodations are new and fairly satisfactory. The train conductors are men from the Emerald Isle, but the subordinates are Cubans. Three days were spent in Havana. Havana is about to undertake the construction of a large intercepting sewer system, and many contractors and contractors' agents were in evidence.

The steamship "Mascot" was taken to Key West, sailing several hours late. A storm had been under way for three days, and the resulting sea sent every passenger to rest before he had been five minutes away from Morro Castle. I was no different from the rest.

From Key West we took the side-wheeler "Shinnecock" to Miami. This trip is delightful. The route lies just outside the Keys, and inside the reefs, in rather shallow water which is perfectly smooth. . . . A large portion of the way bottom can be seen, as well as all kinds of fish. This is the fisherman's paradise. Some of the biggest and most gamey fish are to be found here, and the climate is superb.

From Miami we came almost directly home, stopping only a couple of days in Washington to visit friends.

Timothy W. Sprague has recently been in Arizona, after making a trip last winter into Cuba, examining some gold properties in Yavapai County. His work also took him into Los Angeles where he reports an interview with Lyman Farwell, '87, who is now one of the leading architects of the city, and is adding avoirdupois as well as wealth to his possessions. His returning trip brought him into Chicago at the time of the annual meeting of the North-western Alumni Association, and he assisted Sturges, Shortall,

Schmidt, and one or two other '87 men in the celebration of that occasion, besides getting a number of pointers from Sturges, toast-master, on the proper way to conduct an alumni meeting, some of which could undoubtedly be put into force at the Boston meetings and make them a shade more interesting. He spent March in Washington in consultation with some of the United States Geological Survey in connection with coal land investigations in the South.

From a letter written during his Cuban trip, I quote : —

HAVANA, CUBA, Jan. 19, 1904.

My dear Thomas,—I have just returned from a very interesting trip to Camagüey to examine some old "denouncements," which is the Spanish way of defining what we would call a mining claim. Their method was for the discoverer to denounce whatever acreage he wished upon which he had discovered mineral, or thought he had, and purchase it of the owner at a price which the owner had already placed upon his land in the payment of taxes. This method had a tendency to prevent undervaluation of land, provided the owner had any idea of mineral denouncements being made in his vicinity, and at the same time protected the prospector from exorbitant values being placed upon land which he wished to explore and develop. During the Spanish régime there must have been an army of copyists, notaries, etc., who had to be well supported, as these denouncements are made up of page after page of repetition and flowery language, all of which seems to have been sworn to and acknowledged by any one who had any connection with the case, besides most of his relatives.

Travelling in Cuba is now very comfortable, the new Van Horn railway connecting from Havana to Santiago running comfortable trains with Pullman sleepers and provision for light refreshment on the cars, and meal stations along the route.

Here in Havana everything is very attractive. The city is kept clean, is fairly well lighted, and to an American, or to me at least, it is very interesting. It is, of course, entirely foreign, its streets down town being only about ten feet wide, with sidewalks from twelve up to perhaps thirty inches. The stores are attractive, although both in the stores and in the hotels the very slight use of the English language is surprising. I had an idea that, particularly since the American occupation, I would find English understood and spoken, to an extent anyhow, almost everywhere. By means of a small pocket dictionary, and with the help of a few phrases picked up during the

ten days I stayed at Camagüey and Las Minas and vicinity, I was able to get along very comfortably.

Sunday I took in the great sporting event of the week, the Jai A Lai. This, as you probably know, is the game the concession for which has brought so much adverse criticism upon General Wood. The game itself is an entirely innocent one, being strictly athletic and one of the most interesting and exciting games I ever watched. It is played in an enormous court, 240 feet long, perhaps 30 feet wide and 40 or 50 feet high, with one side open toward the spectators' seats, which accommodated, I suppose, 5,000 people, and are crowded on days of the match games. The criticism comes in from the fact that the company which runs the games (they are played by professionals who receive salaries said to be from \$4,000 to \$8,000 per season) conducts betting in connection with the games; and enormous sums change hands on each contest, of which the house retains a substantial percentage. Moreover, I was told that the house influences the result of the games according to the way its bets have been placed, so that the public has very little chance to win; and the result is that defalcations, suicides, etc., in considerable numbers, can be traced directly to the sport.

Through the kindness of Mr. Lawton I obtained a card of admission to the court this morning, and got some very good pictures of the interior and the implements used in the game.

I expect to sail on the "Vigilancia" very shortly, and will tell you of visits to Moro and Cabañas.

1888.

WILLIAM G. SNOW, *Sec.*, 245 North Broad Street, Philadelphia, Pa.

Henry J. Horn has just been appointed general manager of the Northern Pacific Railway, with headquarters at St. Paul. He was for a number of years located at Livingston, Mont.—Frederick H. Safford is instructor in mathematics at the University of Pennsylvania.—The secretary met F. W. Hoadley in New York recently. He is still located at the American Society of Mechanical Engineers' Building on 31st Street, where he is assistant to the secretary.—William H. Blood, Jr., accompanied by Mrs. Blood, left New York March 4 for a month's trip to Porto Rico.—William G. Snow recently delivered a course of lectures on heating and ventilation to the Senior architects at the University of Pennsylvania.—

The establishment of a college of domestic science is announced at the University of Chicago. Dean Marion Talbot is to be head of the new department. The first courses will be offered at the beginning of the spring quarter, April 1. The courses will include cooking and the study of the science of foodstuffs. It is intended that the work not only shall train a girl to cook, but shall teach her domestic engineering, including house sanitation, public hygiene, the chemistry of foods, and other phases of sanitary science. The only department similar to it in the country is that of the Massachusetts Institute of Technology.—E. P. Quigley, of Birmingham, Ala., title examiner of the Tennessee Coal, Iron, and Railroad Company, recently wrote a very optimistic letter to the secretary in regard to his district, extracts from which are given below:—

Our Valley Creek Canal from Birmingham, about thirty-seven miles south-west to Lock 23 on the Warrior River, has been completed; and by 1910 we expect to have the necessary locks on said river completed. We will then have water rates to the world, and Birmingham will then dictate the price upon coal, coke, pig-iron, steel, and their resultant manufactures to the world's market.

The Birmingham district presents the condition of absolutely contiguous assemblage of the three ingredients entering into the construction of pig-iron: namely, coal, ore, and limestone,—where the average haul to the mills and furnaces here *does not equal a round dozen miles*, thus presenting a position nowhere else and never before duplicated, in geological history. Pittsburg carries her ore over long rough lake passages, and then by rail from the water ports four hundred miles to the furnaces at Pittsburg. . . . I can shoot a rifle from my back porch over inexhaustible deposits of iron ore; while my neighbor two miles across the valley, in which lies the business section of the city, upon the north highlands, can do likewise as regards the range of coal hills upon our north.

Only seven miles up the valley upon our east lie vast deposits of fine fluxing limestone.

Birmingham measures one hundred thousand now. A decade hence with water rates will see us many times that figure, with no limit to our growth.

A half-dozen main systems of railroads furnishes Birmingham her present transportation facilities; while the great Illinois Central is heading this way from the North-west, through the vast coal fields of Walker County upon our

west. . . . We are very much on the *qui vive* as to the possible outcome of the proposed consolidation of the three main industrial companies of the South: namely, Tennessee Coal, Iron, and Railroad Company, Sloss-Sheffield Steel and Iron Company, and the Republic Iron and Steel Company.

Experts have been at work for three weeks appraising the properties of these companies. As they have one-half million acres of mineral lands, with over one hundred and twenty coal and ore mines, furnaces, steel-mills, steel rail mills, and innumerable other plants, with large railroad mileage to inspect and appraise, it is likely they will be at it for two months longer. . . . I was very sorry to have missed old '88's gathering of her elect last June, and especially so as I missed the meeting by such a narrow margin.

Just three weeks afterwards I covered the same territory you fellows left your tracks upon, and also a few hundred extra square miles of the White Mountains.

1889.

WALTER H. KILHAM, *Sec.*, 9 Park Street, Boston.

F. H. Thorp writes as follows:—

The usual routine of class work has kept me busy since school opened. Spent a considerable part of last summer in preparing materials for a new edition of my "Outline of Industrial Chemistry," which I hope will appear during the next spring or summer.

At present arrangements are in my hands for our Summer School of Industrial Chemistry. I have selected Central New York State as a promising field for next summer's trip. Stops will be made at North Adams, Mass., Stamford, Vt., and Mechanicsville, Glens Falls, Syracuse, Rochester, Olean, Buffalo, and Niagara Falls, N.Y. About fifteen days will be devoted to the visits to factories, and opportunity to do some sight-seeing at North Adams, Glens Falls, Rochester, and Niagara will be afforded.

Already over twenty factories have granted us permits to visit them, and several are yet to be heard from. We expect to renew acquaintance with several former Tech men on our trip. Professor Talbot will accompany the party as the head of the Chemical Department.

My family has been increased by a son, Edw. G., born Dec. 20, 1903.

—Owing to the great amount of building construction which will take place in Baltimore owing to the recent conflagration, Keller, Pike & Co. of Philadelphia, of which Clayton W. Pike is a mem-

ber, have opened an office in that city. This office is located at 211 North Calvert Street, in the heart of the business section and adjacent to the Court-house, Post-office, and City Hall. It will be amply equipped to carry on electrical work of any magnitude in the best manner and with the utmost promptness.—L. H. Kunhardt has a letter in the *Boston Herald* of February 19 last regarding the effect of the Baltimore fire upon fire-proof construction. After inspecting the ruins, he thinks that terra-cotta is not a safe material. Good honest brick is best. He advocates solid fastenings for windows, and fire-proofing with sprinklers and pumps for protection. His remarks are extremely interesting.—'89 is to take part in the Alumni Reunion in June next. A circular has been mailed to all members of the class with programme and details. All who do not receive this circular are requested to notify the secretary, giving their correct address.—Mauran was a delegate from St. Louis and Kilham from Boston to the Annual Convention of the American Institute of Architects held at Cleveland, Ohio, in October last. Numerous other Tech men were in evidence.—Pietsch's address is Cosmos Club, Washington, D.C.—Mauran is travelling abroad.—Hollis's address is 150 York Street, New Haven, Conn.—Hart is a director in the newly formed Copley Trust Company in Boston.—Wales expects to remove his office to 15 Beacon Street, Boston, after June 1.

1890.

GEORGE L. GILMORE, *Sec.*, Lexington, Mass.

Norman G. Nims, after being associated with Andrews, Jaques & Rantoul of Boston since graduation, has had an important position with Schickel & Ditmar of New York the past winter, and is now located with his family at Yonkers, N.Y.—Charles H. Alden is treasurer of the Boston Architectural Club. He is with Shepley, Rutan & Coolidge, architects of Boston, and has charge of the Harvard Medical School buildings, a monumental group of fine buildings in white marble, costing between two and three millions. The work is now well under construction. The *Boston Medical*

and *Surgical Journal* of Dec. 31, 1903, referring, in an editorial on the Cancer Question to the report of the New York State Board of Health, calls attention to the appointment of Dr. Gary N. Calkins (M. I. T., Course IX., '90) as consulting biologist as marking a new departure in investigations on the subject, the biological side of which has not previously been developed. Professor Calkins, "whose authority on the subject of protozoa is wide-reaching," is also connected with Columbia University. "Certainly, the laboratory is to be congratulated upon having obtained the services of Professor Calkins, who stands pre-eminent in his knowledge of these lower forms of life." He has a very interesting article on "Protozoa and Disease" in the *Century Magazine* for April.—Willard H. Root is now settled at Grangeville, Idaho.—E. M. A. Machado, the architect, has his Boston office at 9-11 Cornhill.—F. B. Hall is with W. E. Baker Company, engineers, at 170 Broadway, New York, N.Y.—In response to notices for a class gathering held January 31, the following reply of regret came from Jim Carney:—

My dear Gilman,—Sorry I won't be able to help dispose of the crackers, cheese, etc., especially the etc. which Spaulding's grocer has so kindly agreed to furnish. I am thirteen hundred miles away, and the evening trolley service is bad.

Am still railroading, and have entirely dropped the good things that were injected into me in Course V. We did a nice little business in the shop last year,—thirteen new engines, one hundred and sixty heavy repairs, and one hundred and twenty-six light repairs, which is considered a good showing for a shop of this size.

No railroad man has a right to marry, and am still "baching." Give my regards to all the boys.

Jim is in the C. B. & Q. R.R. shops at West Burlington, Ia., and seems to be working for his dollar.—Professor George E. Hale, director of the Yerkes Observatory, the University of Chicago's astronomical station at Williams Bay, Wis., has been awarded a gold medal by the Royal Astronomical Society of London for the invention of the spectro-heliograph. From special cable despatch to the *Sun*, New York:—

LONDON, February 12.—Ambassador Choate attended the annual meeting of the Royal Astronomical Society to-day to receive the society's gold medal, awarded to Professor George Ellery Hale, director of the Yerkes Observatory.

In thanking the society on behalf of Professor Hale, Mr. Choate said that the award was the crowning honor for the work of any astronomer in the world. American astronomers enjoyed the rarest facilities, having about three hundred clear days and nights in a year. Therefore, they ought to achieve something.

The president of the meeting eulogized Professor Hale's work.

In a patent granted on March 22 Mr. E. A. Le Sueur, who is best known by his early pioneer work in the development of the diaphragm cell for the electrolysis of sodium chloride, describes a process for obtaining the copper from mineral mixtures containing only a very small amount of copper, as, for instance, the waste sands from stamp mills.

1891.

HOWARD C. FORBES, *Sec.*, 4 State Street, Boston, Mass.

Walter B. Trowbridge is the chairman of the Building Committee having charge of the construction of the new plant for the United Shoe Machinery Company. This committee made an extended study of modern manufacturing plants and factory sites, and decided upon a location at Beverly, where a plant of twelve buildings is now being erected. The largest of these buildings is 520 feet long, 60 feet wide, and four stories. The construction of the building is entirely of concrete, re-enforced with twisted iron bars. Trowbridge is now associated with Hayden, Stone & Co., in their bond department recently organized, and expects to make trips to New York and elsewhere frequently.—George A. Holmes is managing the factory for the United States Fastener Company. This company controls all the patents on the snap fasteners originally for gloves, but now applied to a great variety of uses. About seventy-two million fasteners of all kinds were turned out last year.—James W. Pierce is the city engineer of

Cambridge. In this capacity he will have under his charge a number of interesting engineering projects. One will be the approach (on the Cambridge side) of the new West Boston bridge; another, the construction of a separate sewer for street drainage to keep the surface water distinct from the sewerage system.—The following note in regard to Mr. Thomas H. Creden was taken from the *Electrical Review* :—

Mr. T. H. Creden has undertaken the compilation of a comprehensive index of all the volumes of Proceedings of the National Electric Light Association since its first convention. Mr. Creden is one of the best statisticians in the electric lighting business, and is also a well-known constructing and operating engineer, having served in both these capacities with the Chicago Edison Company and with Messrs. Stone & Webster. It is intended to have the complete index printed before the Boston meeting of the association, which is to be held on May 24, 25, and 26. This index will be of great assistance to the members of the association, as it will make it an easy matter to find at once any topic or paper to which reference is desired.

—Henry A. Fiske, in his new position as home manager of the Phoenix Insurance Company, Special Risks Department, has recently taken a trip through the West to interview and make the acquaintance of the local agents.—Joshua Hale, of Blood & Hale, engineers, has recently built and financed the Mississippi Valley Traction Company, connecting Moline and Watertown, Ill. This road has now been in operation a little over a year, and is proving a great success. The new shops of the Rock Island Railroad have been located on their line.—Fred A. Wilson writes :—

I am living in Nahant, where our offices and mill are located, although most of our business is farther down the shore. The building operations we conduct are sometimes scattered, but chiefly centred about the North Shore, so called. We have been fortunate enough to build nearly all of the largest summer residences in the Beverly district. I am also connected with a large and vigorous lumber concern in Lynn.

I have a boy, born Nov. 2, 1903, and a girl nearly four years old. I am an enthusiastic amateur gardener in spare times, and of course keep up my old-time interest in my library. I have a comfortable home, with a spare room and a warm corner in it for any classmate who strolls my way; and

pray tell them never to come near without coming in. I am somewhat off the beat of most of the boys, and yearn for a look at the old friends.

It has been my good fortune to see Dart once or twice at Tech Club, and of course I have a word now and then with others I meet on the street, including your good self. With Clifford Tyler we have some pleasant business relations. Douglass and Bryden I see on the train. We go in to Boston over the same line. H. G. Bradlee, whom I claimed for a friend when we were at Chauncy Hall School together, I have been so fortunate as to see often of late on business connected with an electric road to Nahant. I should like to know something of E. C. Smith and Carvalho, both also Chauncy Hall boys.

Please tell the boys to be neighborly. In summer especially is it pleasant and easy to get to Nahant. Take the steamboat. Nahant is the coolest place in Massachusetts. So 'phone me (527 Lynn) that you and Mrs. will be down to dinner, and come and get cooled off.

Wilson was on the committee in charge of the Nahant celebration last summer.

1892.

PROF. WILLIAM A. JOHNSTON, *Sec.*, Mass. Inst. of Technology.

The class was well represented at the alumni dinner. The following members were present and thoroughly enjoyed themselves: Braman, Derr, E. R. French, Fuller, Johnston, Metcalf, Park, Pope, Skinner, Wales, and Wendell.—Lewis P. Cody writes:—

I have but little opportunity to get any class news out here, as I am the sole survivor in this vicinity (Grand Rapids, Mich.). However, I attended the annual banquet of the North-western Alumni in Chicago on February 27, and there met a few of our class. There were only four of us,—Burrage, Lukes, Wells, and myself; but we made up in quality what we lacked in quantity, and we made the old Rackety-whack Class Yell work overtime. Burrage is as good as ever at arousing enthusiasm, and the others furnished suitable backing.

— Mary S. Pope writes:—

While on a recent trip through Western Pennsylvania, I met Albert K. Church, V., who for several years has been with the National Tube Company, now controlled by the United States Steel Company. Church has

just been promoted to the position of manager at the tube mill in Middletown, Penn., where he has about fourteen hundred men under his charge.

— Philip M. Burkank, VI., who has recently returned from Snokomish, Wash., where he has been employed by Stone & Webster in developing a water power plant to transmit electricity to Tacoma and Seattle, is now employed by the Factory Mutual Insurance Company at 31 Milk Street, Boston.— At the regular meeting of the Boston Society of Civil Engineers held Jan. 27, 1904, William W. Locke, '92, was made a member. The following is a record of Locke's professional work, which was filed with his application for membership:—

William Willard Locke, South Framingham, Mass. (b. 1865). Graduated as a sanitary engineer from Massachusetts Institute of Technology in 1892. For two summers before graduation worked in the City Engineers' Office, Nashua, N.H.; from June, 1892, to January, 1895, was assistant in engineering department of Massachusetts State Board of Health; from January, 1895, to August, 1895, was assistant sanitary engineer of Health Department of Brooklyn, N.Y.; from August, 1895, to February, 1898, was sanitary engineer in same department; and since February, 1898, has been the sanitary inspector of the Metropolitan Water and Sewerage Board. In 1897 was elected associate member American Society of Civil Engineers.

1893.

FREDERIC H. FAY, *Sec.*, 60 City Hall, Boston, Mass.

The first of the informal class dinners of the past winter was held at the Technology Club on the evening of the 23d of January. Professor Harry E. Clifford, the guest of the evening, described the equipment of the new Augustus Lowell electrical laboratory, and spoke of the development of the electrical engineering course; and he started a discussion of the proper trend of technical education. While, in a way, the meeting flavored somewhat of the shop, it was decidedly interesting. Every man there advanced some idea, and all profited by the interchange of views between the teacher and the practising engineer. Besides Professor Clifford the attendance was: C. V. Allen, Biscoe, Blood, Crosby, Dawes,

Densmore, Fay, Heywood, Keyes, H. A. Morss, E. S. Page, Pickert, Reynolds, C. W. Sawyer, Spofford, and R. N. Wallis. Allen came over from New York, Heywood from Holyoke, and Wallis from Fitchburg. A pleasant incident of the evening was the arrival of a box of handsome carnations sent to the class with the compliments of the class of '98. At the second informal class dinner, held at the club on the 19th of March, Professor Davis R. Dewey gave an interesting talk upon the work of the Carnegie Institution of Washington, and upon certain matters of public interest with which he has been connected during the past year. About nine o'clock the class adjourned to the Tech Union, in the rooms formerly occupied by the Lowell School of Design over the "Shops," as we used to call them, on Garrison Street. There, in company with Bullard, '87 (of Tech Song Book fame), Coburn, '87 and '98, and a few others, the remainder of the evening was spent most enjoyably in singing Tech songs and other college songs. The attendance at the second informal dinner was Dr. Dewey and one other guest and the following class members: Barnes, Bemis, Biscoe, Blood, S. A. Breed, Crosby, Dawes, Densmore, Fay, Heywood, Johnson, Leeds, H. A. Morss, Pickert, C. W. Sawyer, Spofford, Sweet, Taylor, and Tenney.—At the annual dinner of the Alumni Association, Dec. 21, 1903, the following '93 men were present: Barnes, Bemis, Braman, Bremer, W. A. Clapp, Crosby, Fay, Frisbie, Keyes, Wingate, Woodbridge.

The following extract is from the *Engineering Record* of Aug. 15, 1903:—

Although statistics oftentimes may be of no value, they may nevertheless be interesting. The class of 1893 of the Massachusetts Institute of Technology has recently published its decennial catalogue in which one finds the following interesting features. The statistics concerning marriages show that of a class membership of two hundred and seventy-three only 57 per cent. are married, and that the average per family is one child. These figures tend to strengthen the views that President Roosevelt and President Eliot of Harvard hold regarding the question of "race suicide." Another subject to which attention is given in the catalogue is that of incomes. Each member of the class was asked to give the amount of his annual income from

his professional or business efforts. In response one hundred and eighty-five men reported incomes ranging from \$500 to \$35,600 per year, with an average of \$3,082. If the ten men who receive over \$10,000 per year are omitted from the list, the average of the remainder then becomes \$2,355. This average is a high one; but, doubtless, if all the circumstances were reported, there would be a reason apparent consoling to men who in ten years have not seen even \$3,000.

— Charles V. Allen, electrical engineer in the foreign department of the Westinghouse Electric and Manufacturing Company (at 11 Pine Street, New York), is the author of two papers of much interest, published in the *Engineering Magazine* for October and November, 1903, entitled "Diamond Mining in the Kimberly Field" and "The Mechanical Equipment of the Kimberly Diamond Mines."— The address of Franklin G. Ashton is Room 403, Union Station, St. Louis, Mo.— Francis Du Pont Balch's address is 45 William Street, New York, N.Y. He is still engaged in the fire insurance business.— Minard T. Barbour, who has been connected with the Otis Elevator Company for five years, has been transferred from Montreal to the St. Louis office of that company, his address being 321 Security Building, St. Louis, Mo.— James C. Boyd is an assistant engineer with Westinghouse, Church, Kerr & Co., 10 Bridge Street, New York, N.Y.— Farley G. Clark, formerly electrical superintendent of the Ninety-sixth Street Power Station of the Metropolitan Street Railway Company of New York, has recently taken a position as electrical engineer with Westinghouse, Church, Kerr & Co., 10 Bridge Street, New York, N.Y.— A recent number of the Boston *Herald* was ornamented with cuts of our classmates, Crosby and Buchanan, who assisted in the preparation of a musical extravaganza produced in Woburn by the Towanda Club of that city. Buchanan wrote many of the lyrics, while Crosby composed a portion of the music and drilled the soloists and chorus, fifty in number.— Henry Baldwin Dates is professor of electrical engineering and dean of the School of Applied Science of the University of Colorado at Boulder, Col.— James A. Emery, formerly manager of construction, is now vice-president and general manager of the Birmingham Railway Light and Power

Company, Birmingham, Ala.—Edmund J. Fairfield is manager of the Liability Department of the Travellers Insurance Company at Cleveland, his address being New England Building, Cleveland, Ohio.—Frederic H. Fay was recently transferred from the grade of associate member to that of member of the American Society of Civil Engineers.—Charles D. Heywood, for many years assistant superintendent of the Deane Steam Pump Company of Holyoke, Mass., has recently become a member of the firm of Walsh & Heywood, proprietors of Walsh's Holyoke Steam Boiler Works.—Myron Hunt, architect, has removed his offices from 123 La Salle Street, Chicago, to the Union Trust Building, corner of Spring and Fourth Streets, Los Angeles, Cal.—Charles H. Johnson is superintendent of concrete construction for W. A. Murtfeld & Co., 31 Milk Street, Boston.—Edmund I. Leeds, who was a special student in architecture with our class, is a member of the firm of Brainerd, Leeds & Russell, architects, 8 Beacon Street, Boston. By some unexplained mistake, Mr. Leeds's name has so far been omitted from the list of class members. Fortunately, the error was discovered, and Mr. Leeds was welcomed at the informal dinner in March.—Emil Lorch, who spent two years at Harvard University as a graduate student and assistant in architecture, and received from that university last year the degree of Master of Arts, is assistant professor of architecture at the Drexel Institute of Philadelphia. His address is 216 South Thirty-seventh Street, Philadelphia, Pa.—The address of Willard A. Marcy is 11 Broadway, New York, N.Y.—Benjamin M. Mitchell is assistant general manager at Johannesburg for Fraser & Chalmers, Limited, of England, his address being P. O. Box 619, Johannesburg, South Africa.—At a meeting of the Boston branch of the American Institute of Electrical Engineers, held at the Lowell Building of the Institute on March 2, Henry A. Morss, of the Simplex Electric Company, presented a paper upon "The Manufacture of Insulated Wires and Cables."—Archibald Murray is with the engineering department of the Canadian Pacific Railway at Dinorwic, Ontario. His permanent address is Yarmouth, N.S.—The following account of the

wedding of Frank Ferguson Phinney is taken from the *Boston Herald* of March 13, 1904:—

A number of Boston people were interested in the wedding, on Wednesday of last week at Southbridge, of Miss Mary Elizabeth Wells to Mr. Frank Ferguson Phinney, which took place at the bride's home. Mr. Phinney is the treasurer of the First Corps of Cadets, and a member of the Puritan and Exchange Clubs. . . . Mr. E. J. W. Morse was best man. The bride wore a white lace gown and carried valley lilies. Her veil was the same worn by her grandmother seventy years ago. There was a large reception from 8.30 to 10.30. Mr. and Mrs. Phinney will live in Warren.

— Harry Fay Roach is practising architecture at 1403 Chemical Building, St. Louis, Mo.—George W. Sanborn recently missed, by a narrow margin, a Republican nomination for alderman at Butte, Mont. He has been chosen a member and permanent secretary of the Republican City Committee of Butte.—Edward S. Sanderson is mechanical engineer with the Scovill Manufacturing Company of Waterbury, his address being 153 Hillside Avenue, Waterbury, Conn.—William H. Sayward, Jr., M.D., who was formerly located in Dorchester, has recently commenced practice at Wayland, Mass.—Miss Londa L. Stebbins is probation officer of the Juvenile Court of San Francisco, at Room 259 City Hall, San Francisco, Cal.—S. P. Waldron, formerly engineer of the Berlin plant of the American Bridge Company, has been transferred to 7 West Twenty-second Street, New York, N. Y., and appointed engineer in charge of that company's New York and Brooklyn offices.

1895.

GEORGE W. HAYDEN, *Sec.*, 493 Warren Street, Roxbury, Mass.

Clifton B. Sanborn, of Norwood, recently assumed the position of assistant clerk of courts of the Northern Norfolk District Court at Dedham, succeeding Edwin M. Grover, of Needham, who resigned to become assistant register of probate of Norfolk County. Mr. Sanborn was born in Norwood, Aug. 1, 1874, and

is also a graduate of the Harvard Law School, class of '99. He has been a member of the Norwood School Board since 1900, and its chairman the past two years. He is a member of Orient Lodge, A. F. and M., and Hebron Chapter of Norwood. He was admitted to the bar in 1899.—The following extracts are from a letter from François E. Matthes under date of February 29:—

I have returned sometime ago from the Grand Canyon of the Colorado, where I have spent the better part of two years. . . . As you probably remember, I have had quite a siege in the Rocky Mountains in Montana for two seasons. The map—the Chief Mount Quadrangle—is not yet published, altogether the field work was done in 1900–01. . . . I hope the sheet will be out next month. The Grand Canyon work makes the Chief Mount sheet dwindle into comparative insignificance, and the difficulties for the engraver are sure to be a hundred per cent. worse.

The area covered (480 square miles) comprises what is known as the Kaibab section,—near the upper end of the canyon,—both the widest and most beautiful part. It was mapped on $\frac{1}{45000}$ scale with fifty feet contours, altogether a different proposition from the old Bodfish-Renshaw map with its non-committal 200 feet contours. It is to be published on $\frac{1}{48000}$ scale, and at my suggestion the accentuating of the fifty contours has been tabooed. The field operations—entirely under my charge—were unusual in many respects, and deserve fuller description some day. . . . The conditions were not only topographic in character, but also climatic. Part of the year it was too hot to live in the bottom of the canyon, and part of the time too cold on the high plateaus. On the other hand, the peculiar canyon topography made an ideal piece of plane-table intersection work. Just think of spending eight full days on one single point on the rim, from 8 A.M. to 5 P.M. (camp being only a few miles away). A number of such points were occupied. The actual number of intersections taken from any one station I have never counted, but they must run in the thousands. On an average, one point in ten had its elevation determined by vertical angles. The number of vertical angles read often exceeded one hundred (from one station there were over five hundred). The intersecting of so many points located close together, and sighted at all sorts of ranges (from less than a mile to ten miles), naturally demand a special system of recording for reference, the ordinary methods of recording descriptions of points sighted being too bunglesome and altogether inadequate. I elaborated a method used by me in the Rockies, by which preliminary contour sketches replaced written descriptions, and which

I have termed the "preliminary sketch method." Very few topographers use a method of this sort, and I venture to say none has elaborated a perfect system on these lines. That mine is an unqualified success is attested by the fact that, out of the thousands of sights taken in the canyon, not one was lost through failure to identify the point again from subsequent stations.

Aside from the engineering part, the geology of the Grand Canyon sheets has proved particularly interesting, as might be expected. A number of minor points in the structure of the plateaus were brought out by the mapping.

Of course, all the work was done from camps, part of the time wagon-camps, and part pack-camps. The canyon was crossed four times by me, and four times by the triangulation party. Several animals were killed, and any number of them injured by falls and accidents. The Grand Canyon far exceeds the Rocky Mountains for rough and dangerous travelling, and the crossing of the Colorado River itself is a risky undertaking at any time. Just the same I feel that I have thoroughly enjoyed the campaign, and I would not mind having another spell like it. I am thinking of writing up the engineering features, and possibly also a popular account of the adventures. I have been able to take numerous photographs, many of them of scenes never photographed before. Perhaps some day I shall use them for stereopticon views. I intended to come over to Boston this winter, but I don't see my way out to make the trip, for lack of time.

1896.

EDWARD S. MANSFIELD, *Sec.*, 70 State Street, Boston.

The annual meeting and dinner of the class, which for the last few years has been held during the month of March, has been postponed this year, in order that it may be included in the festivities of the Tech Reunion. The dinner will probably be held on Tuesday evening, June 7, notices of which will be sent out in due season; and it is earnestly hoped that a large number of the class will make a special effort to attend this dinner as well as the other appointments of the reunion.—Joseph H. Knight, formerly of Honolulu, representing Holmes & Stanley, is now associated with the new law firm of Burdett, Wardwell & Snow, with offices in the India Building, 84 State Street.—Walter M. Stearns, for several

years assistant superintendent of the Waltham Gas and Electric Light Company, has resigned to accept the position of superintendent with the Electric Light Company at South Bend, Ind.—F. B. Owen, formerly with the Narragansett Electric Light Company of Providence, R.I., is now connected with the Fort Wayne Electric Company of Fort Wayne, Ind., in the capacity of special agent for the company, and has been covering the central part of the country as their representative. He expects soon to start on a trip through the Southern States, and also to Havana, Cuba.—C. K. B. Nevin is temporarily located in Williamstown, Mass., as superintendent for Allen & Collins, architects, in charge of the building of the Thompson Memorial Chapel for Williams College. It is claimed that this will be one of the finest college chapels in the United States.—In July, 1903, George K. Burgess left the University of California, where he held the position of instructor in physics, to accept his present position as assistant physicist to the National Bureau of Standards at Washington, specializing in pyrometry. The Bureau of Standards, which is the outgrowth of the Office of Weights and Measures, is soon to have at its disposal what probably will be the best-equipped physical and electrical testing laboratories in the country. The Electrical Division of the Bureau is to test at St. Louis all the portable electrical apparatus submitted in competition at the coming fair.—William H. Clifford, captain United States Marine Corps, is at the present time stationed at the League Island Navy Yard, Pennsylvania. During the Spanish War as lieutenant in the navy, he was engaged in coast-guard duty. After being mustered out, he was commissioned a first lieutenant in the Marine Corps, serving at Washington, in the Philippines, in the Pekin relief expedition, and taking part in the capture of Tien-tsin. Later he was stationed at the navy yard at Portsmouth, N.H., and has served with the North Atlantic fleet at Culebra, W.I., also on board the "Chicago" and "Illinois." He has been ordered to command a company for duty at the Marine Camp at the St. Louis Exposition.—Marshall O. Leighton is chief of the Division of Hydro-Economics, United States Geological Survey, with headquarters at Washington. The work of his department includes the

investigation of the duty of water, its character, the resource which it represents, its damage by pollution, and its applicability for use in the various lines of manufacturing and other special development. He has also been appointed by Governor Franklin Murphy, of New Jersey, chairman of the Engineering Committee of the New Jersey Flood Commission.—N. C. Grover, who has for the past year been in charge of the hydrographic work of the United States Geological Survey for New England, has recently been put in charge of the hydrographic work of the eastern United States, with headquarters at Washington.—A. C. Lootz is located at Reno, Nev., on reservoir construction for irrigation, under the United States Reclamation Service.—A. L. Drum is general manager of the Union Traction Company of Indiana, and is now engaged in the construction of a specially equipped electric road from Indianapolis to Chicago.—H. A. Pressey, who for the last five years has been investigating the undeveloped water powers of the country for the United States Geological Survey, has recently been retained by the banking firm of Hugh MacRae & Co. as consulting engineer in connection with the development of water powers for transmitting electric power to cotton mills and other industrial plants. He has also an engineering office at 1416 F Street, Washington, where he handles general hydraulic work, water powers, water works, sewerage systems, together with some bridge and railroad work. For the last three years Pressey has been the professor in charge of civil engineering at Columbian University, and has lately been elected to membership of the governing board of the University Club at Washington.—Messrs. Whitney, Stickney, and Putnam are connected with the Central Union Telephone Company which represents the Bell Telephone Company's interests in Ohio, Indiana, and Illinois.—L. N. Whitney is division superintendent in charge of the State of Indiana.—J. W. Stickney has charge of the equipment in the same State.—J. L. Putnam is district superintendent in charge of the company's interests in the northern half of the State.—W. G. Wall is superintendent for the National Electric Vehicle Company of Indiana.

1897.

JOHN A. COLLINS, JR., *Sec.*, 79 Tremont Street, Lawrence, Mass.

The class was well represented at the "Liquid Sunshine" dinner of the Technology Club of New York. The men managed to get seats together, and a lively reunion was the result. Those present from the class were Joseph Bancroft, A. S. Hamilton, Benj. A. Howes, Harry B. Hunt, John P. Ilsley, Jr., A. C. Lamb, George H. McCarthy, Thomas Vinton, and H. E. Worcester.—I. du Pont has taken charge of the construction department of the E. I. du Pont Company of Wilmington, Del.—James W. Smith, who for the past year has been assistant to the chief engineer of the American Steel and Wire Company at Worcester, has been made master mechanic of the same works.—In accordance with the general plans being made by the Alumni Committee for a grand reunion of classes during the Commencement Week, it is proposed that '97 hold its dinner on the evening designated by said committee, and that also it hold an informal reception at the Alumni Reception the Monday night previous. Details will be given later.—On March 7 the secretary received a welcome letter from Lieutenant William A. Kent, Course I., who is at present stationed with his regiment, the Twenty-third Infantry, at Camp Vicars, Misamis, Philippine Islands. In order that others may enjoy the same, extracts are given below. The letter bears the date of January 14:—

I have just been reading my October REVIEW, which reached me a few days ago; and the spirit moves me to let you know I am still living, or I might better say existing.

We left here in September, 1901, for New York, via Suez, and had a fine trip, marred only by the shortness of our stays at Singapore, Columbo, Malta, and Gibraltar, at which places we stopped to coal. The trip was also slightly marred by a few days' storm as we were crossing the Atlantic.

We arrived in New York on December 1, and we went to Plattsburg, N.Y., for station. We put in a very pleasant year and a half there, and in April, 1903, started out here again.

This is, I believe, the coldest place in the Philippines, 2,800 feet above sea level. We have to wear flannel shirts to keep warm, use two and

sometimes three blankets at night. More than once I have gone to bed in the afternoon in order to keep warm. The temperature is not so low, varying from 58° to 76° ; but the altitude and the wind combined certainly do make us shiver. I went in to see the commanding officer the other day, and found him with a blue cloth overcoat, khaki blouse, blue flannel shirt, and woollen undershirt on, besides the usual clothing below the waist. Still he was shivering, and all doors and windows closed, too.

We have fine scenery and lots of climate, but — we are twenty-three miles from the coast, transportation is bad, no ladies or children are allowed up here, and it gets very monotonous.

Those of my classmates who knew me at Technology would hardly recognize me now. I am about forty pounds heavier than I was then, all of it gained out here, so that I tip the scales now at 190 instead of 150 as in '97.

Please remember me to all '97 men whom you see.

1898.

C.-E. A. WINSLOW, *Sec.*, Hotel Oxford, Boston, Mass.

The secretary has been so busy with the preparation of the Class Book (which will be ready for distribution at the class dinner in connection with the June reunion) that he has not amassed many '98 notes other than those to be contained therein. Some of the information collected for the book is, however, of general interest; and in particular the question, "What changes or improvements do you think should be made at the Institute?" elicited replies, some of which may be briefly summarized here. A majority of the men did not answer this question at all or merely expressed their confidence in the judgment of the President and Corporation. A fairly large minority, however, were at one in expressing a desire for two things, a broadening and humanizing of undergraduate life and the establishment of a dormitory system. Russell says, "Any change which can be made to broaden the life of the undergraduate." Watkins says, "It is my opinion that the Institute should abandon the present site, and get out into the suburbs, within, say, ten miles of Boston, where it can have room to grow. I say let sentiment for the Boylston Street location give way to progress." "The furtherance of the good work of Professor Bur-

ton in bringing the instructors and students closer together, and in inducing one to trust and aid the other" (Babson). "The moving of the entire Institute to one of the suburbs where more college life can be enjoyed, where more instruction can be given for the same outlay of money, and where poor students can live more economically than in Boston" (Barker). "Removal to a situation where there will be room for all the buildings to be on a common lot, with space for athletic fields and dormitories, which will be conducive to greater college feeling and will insure better health for the students" (Sturtevant). "A better chapel, movement to Brookline, and the establishment of 'Versuchanstalts' similar to the ones at Charlottenburg. These research laboratories are the greatest advantage this technical school has over M. I. T.," (D. Q. Brown). "I believe the Institute should decide at an early date on some definite policy for the future. Personally, I believe the Institute should move to a location providing plenty of room for its expansion along broad lines. The present location seems quite inadequate, and work is carried along under certain disadvantages which could be removed in a new location" (Philbrick). "By all means move to suburbs, build dormitories or houses, and have college buildings in compact group. Social development, as represented by what is known as college spirit or college life, is Tech's weakest feature in training men as distinguished from engineering machines" (Dater). Howard, Gilbert, Ingalls, R. E. Kendall, Lansingh, and Spaulding, all speak for dormitories and more college life; Cottle, Mara, Mommers, C. H. Smith, Hutchinson, Bishop, Brewster, Huntington, Tallmadge, and Streng favor a suburban location; Goodrich, Goldsmith, Paige, and Priest call for more college spirit. On the other hand, A. L. Davis says: "The less change, the better. The danger is more of losing what is precious than of not bringing in enough that is new. Of course, natural expansion and development will bring many changes, and they will be beneficial. But it will be a dreadful mistake to treat the students as children, or even as such colleges as Harvard and Yale do. The Institute should continue to treat its students as free American citizens. They will continue to rise to the situation."

With regard to the other important change of policy which has been recently discussed, Cornell writes as follows: "Principal one to move away from city. Combine with Lawrence Scientific School, if it can be arranged to keep it a separate institution from Harvard and under the old name." Coburn, on the other hand, ends his paper with the emphatic statement: "Tech should not move. As to consolidation with 'the enemy' across the Charles" (here follows four-word quotation from Gelett Burgess). In similar vein, Bragg says: "I think the Institute should remain an independent institution, and continue the magnificent work she has done and is doing. I fail to see any reason for affiliation with any other institution." So Muhlig: "I have seen some talk in the papers of a union between Tech and Harvard. I should like here to voice my opposition to such a union. Tech has made a name for itself and a reputation that is recognized all over the country, and I for one should not like to see Tech swamp its personality by joining Harvard." So Pease: "I think President Pritchett is qualified to look after changes and improvements, if he will keep M. I. T. from the clutches of Harvard" (here follows that four-word quotation from Gelett Burgess again). So Treat: "Remove all chance of Tech uniting with Harvard. Cinch the thing forever." So Winslow: "I believe as I did in '98 that the future of the Institute lies, 'not in wealth and mere material prosperity, but chiefly in its unswerving loyalty to the great men and the great traditions of the past.'"

1899

MILES S. SHERRILL, *Sec.*, Mass. Inst. of Technology.

J. H. Walton has returned from study in Heidelberg, where he obtained the degree of Ph.D. under Professor Bredig. He is now instructor in chemistry at the University of Illinois in Urbana, Ill.—W. C. Phalen is connected with the United States National Museum of the Smithsonian Institution in Washington, D.C. He has recently published an excellent paper, entitled "Notes on the Rocks of Ungsuaks Peninsula and its Environs, Greenland."—

E. B. Phelps is engaged at the Sewage Experiment Station of the Institute, located on Albany Street. Besides the routine work connected with the experimental purification of sewage, he is making a special study of the chemistry and the chemical analysis of sewage. He is the proud father of a seven months' old boy, who will doubtless enter the Institute with the class of '25.—T. F. Lennan was in town recently, and looked up some of the boys. Lennan is superintendent of a large zinc mining and smelting company at Joplin, Mo. He was looking as prosperous and jolly as ever.—W. M. Corse has a position as chemist with the Detroit Lubricator Company.—H. L. Morse has passed the examinations for the United States Army, and will receive his appointment after the present first class at the Military Academy.—H. S. Mork and "Doc" Skinner are connected with the firm of Little & Walker, chemical experts and engineers, 93 Broad Street, Boston. Mork was married last October to Miss Estelle C. Williams at Brookline.—Edwin Sutermeister was married to Miss Bertha Marie Babb at three o'clock on the afternoon of Thursday, Dec. 31, 1903. The ceremony was performed at the home of the bride's uncle at Westbrook, Me., and the reception which followed was largely attended by guests from Boston, Portland, and Westbrook. Clifford M. Swan, of Brookline, officiated as best man. Mr. and Mrs. Sutermeister will reside at Westbrook, Me., Sutermeister has been with the S. D. Warren Paper Company of that city since his graduation.—George R. Townsend is the chief estimator for the Fore River Ship and Engine Company at Quincy, Mass. Mr. Townsend has but recently come to this city, having been for the past four years with the William R. Trigg Shipbuilding Company of Richmond, Va. In 1899 he went to England to assist in the trials of H. M. S. "Albatross." He was also the representative of the contractors during the trials of the United States destroyers "Dale" and "Decatur" and United States torpedo boats "Shubrick," "Stockton," and "Thornton."—Bassett Jones, Jr., is located in New York City, where he is a consulting engineer for the mechanical and electrical equipment of building. He is also supervising engineer for Douglas Robinson and Charles S. Brown & Co. of that city.

1901.

E. B. BELCHER, *Sec.*, Quincy, Mass.

The class has held two successful dinners at the Tech Union, thirty men being present at the January dinner and twenty at the one in February. The guests at the first dinner were Mr. Blachstein and Professor Allen, who gave the men some very interesting information concerning the conditions of the Institute at the present time. After the speeches the class was entertained by Mr. Proulx and some of the ex-members of the Glee Club, who furnished music from the Tech Song Book. At the February dinner Professor Clifford was present, and gave a most interesting talk on present conditions at the Institute and the duty of the alumni in regard to the proposed revision of the courses. He argued for a more thorough grounding in the principles of the various studies rather than the present drift toward patchwork courses. It was voted at this meeting that the class should participate in the Technology reunion, and that some provision should be made for the entertainment of visitors and members of the class. At the dinner held on April 1 Mr. Charles F. F. Campbell gave a very interesting lecture on "Teaching the Adult Blind how to become Self-supporting." It was illustrated by lantern views and moving pictures, and some excellent music was furnished by a blind musician.—George P. Shute, X., is in charge of the installation of a water-filtration plant at Jamaica, L.I.—A. W. Peters, I., is at home in Roxbury, recuperating from the effects of his recent illness.—O. S. Stockman, III., is in Pittsburg, working for the Armstrong Cork Company.—Roger W. Wight, XIII., has left the Bath Iron Works, and is getting practical experience at sea.—Robert W. Bailey, XIII., is at the Brooklyn Navy Yard.—F. F. Dorsey, II., is connected with Phillips, Van Everen & Fish, Exchange Building, Boston.—Frank J. Eager, III., is working for the Boston Transit Commission.—The secretary has been informed of the recent marriage of W. E. Farnham, VI.—Percy F. Goodwin is with Walter B. Ross, engineer and con-

tractor, Boston.—Charles E. Martin, IV., is at West Bethlehem, Pa., with the Guerber Engineering Company.—Born, on March 12, a daughter to Mr. and Mrs. Willard Wellman Dow.—It will be a very great help to the secretary if the members of the class will respond promptly and fill out the sheet enclosed in the annual notice.—On March 15 M. C. Brush assumed the office of general manager of the Newton, Lexington & Boston, Newton & Boston, and the Westboro & Hopkinton Street Railways, and the Norumbega Park Company,—a position recently created. Mr. Brush will relieve President Claflin of the Boston and Suburban Electric Companies of the details of management. Mr. Brush has been an officer on vessels on the Great Lakes, in railroad business in the West, and assistant to President Claflin.—F. H. Sexton has gone to Halifax, N.S., to be Professor of Mining Engineering at Dalhousie College.

1902.

CHARLES W. KELLOGG, JR., *Sec.*, 51 St. Paul Street, Brookline, Mass.

The secretary is pleased to report the following marriages and engagements which have leaked out since the last class notes went to the REVIEW: Ferrin was married on January 21 to Alice Rebecca Cotton, of Nashua, N.H. They are now at home at 1515 Middlesex Street, Lowell, Mass.—Haddock was married on June 24 to Ceres Heywood, of Cambridge, Mass.—The class will be very much grieved to hear that Red. Proctor, who was on the eve of being married to Miss Hedrick in Salisbury, N.C., had to give it up on account of his lungs. He is now at Saranac Lake, N.Y., P.O. Box 122.—Pember is engaged to be married to Amy Gertrude Henette, of Highlandville, Mass.; and Seabury, to Miss Knight, of Providence.—Farmer is engaged to Miss Capen, a daughter of President Elmer Capen, of Tufts College.—The following changes in occupation and address have been reported since the last REVIEW: I. Williams is yard clerk in the Keyser Freight Yard, Baltimore & Ohio Railroad, Keyser,

W. Va.—Seabury is assistant engineer with the O'Rourke Engineering Construction Company, New York: his address is 64 E. 49th Street, New York City.—C. H. Boardman, Jr., who was last heard from in Pittsburg, has returned to Boston, and is now with Edward A. Tucker, architectural engineer, 161 Summer Street. He lives at 53 Breed Street, Lynn.—Egan, who left at the end of the Freshman year, is now superintendent of the Logging Railroads of the Kaul Lumber Company, Hollins, Clay County, Ala.—Bonnemort's address is now 25 Rutgers Street, Utica, N.Y.—Mason is in the engineering department of the new hydraulic development being carried forward by the Hudson River Water Power Company at Glens Falls, N.Y.—Hervey's box in Schenectady, N. Y., is 877.—J. Philbrick is assistant superintendent of the West 44th Street Station of the Consolidated Gas Company of New York; residence, 318 West 56th Street, New York.—Towne is with the Burgess Sulphide Fibre Company, Berlin, N.H.—R. F. Whitney, who left the Institute about Junior year, is now secretary and manager of the Whitney Machine Company at Winchester. He also enjoys the distinction of having his dues paid the farthest ahead of any man in '02; to wit, through Dec. 31, 1908.—Brainerd lives at the Rectory, Great Neck, N. Y. He is a transitman on the D., L. & W. R.R. at Hoboken, N.J.—Morrill's address is 11 Spring Park Avenue, Jamaica Plain.—Coburn's address is now 158 Washington Street, Malden, Mass.—Simpson is in the Philippines. His address is Bunavista, Guimaras Island.—Durham is a mining engineer in Poleta, Cal.—Hunt's address is 674 High Street, Bath, Me.—Baetjer is draughting in the office of the engineer of bridges (1115 Union Station, Pittsburg, Pa.) of the Pennsylvania Lines West of Pittsburg.—I. R. Adams is an architectural draughtsman with Howard Greeley, 33 Union Square West, New York City.—Nichold is architectural draughtsman with Charles W. Leavitt, Jr., 15 Cortlandt Street, New York, N.Y.—Greeley is with Sturgis & Barton, architects, Tuxedo, N.Y.—H. E. Bartlett is an architectural draughtsman in the office of the Supervising Architect, Treasury Department, Washington, D.C.—The name of Hudson's firm was in-

correctly reported in the last Class Report. It should be J. J. Grover's Sons. His address is 56 Baltimore Street, Lynn, Mass. — C. H. Porter is with the Chase-Shawmut Company, Newburyport, Mass. His address is 6 Washington Street, Newburyport. — Mayo is in the heating and ventilating department of the Supervising Architect's office at Washington, D.C. He lives at 1506 P Street, N. W. — R. Kennedy is at Hilo, Hawaiian Islands, working with the Waiakea Mill Company. — Pollard has gone to the Patch Manufacturing Company as erecting engineer. — Had-dock, whose marriage was mentioned above, is assistant engineer with the Massachusetts Harbor and Land Commission, State House, Boston. He lives on Greenwood Street, Greenwood, Mass. — Cook is down in Mexico as assistant superintendent of the Ferreras Mine, a silver-lead proposition owned by the Velardeña Mining and Smelting Company, Velardeña, Estado de Durango, Mexico. He should be addressed in care of the above company. — G. E. T. Edgar, who left the Institute at the end of the Freshman year, is in the railway and engineering department of the General Electric Company at Schenectady, N.Y. — Goldenburg has left Pittsburg and gone to Detroit, where he is in the employ of the Trussed Concrete Steel Company. — Blodgett is back in Boston working for the Blodgett Clock Company, 141 Franklin Street, Boston. — W. N. Brown is inspector for the Fairbanks Scale Company, 38 Pearl Street, Boston. He lives at 167 West Newton Street. — Chapman left Sydney, Cape Breton, in January, and is now night superintendent of coke ovens with the Maryland Steel Company. His address is P.O. Box 28, Sparrow's Point, Md. — The class had a very pleasant time at its meeting on March 4, 1900, at the Tech Union on Garrison Street. About twenty-five men were present. The matter of the Alumni Reunion in June was presented to the class, and received with great enthusiasm. It was voted to have the annual meeting and dinner on the evening of Tuesday, June 7, 1904, just before the Tech Night at the Pops. '02 will keep open house for all comers during the three days of the June Reunion. The matter of ways and means for the celebration was referred to the Executive Committee with full powers.

1903.

CLAUDE P. NIBECKER, *Sec.*, Glens Mills, Penn.

On January 13 an informal dinner was held at the Union. In spite of the rainy weather nineteen men showed up, and had an enjoyable time telling stories and singing. A letter in regard to the reunion at Commencement was read by President Morse. The class officers are forming plans for the co-operation of the class with the Reunion Committee, and therefore the class dinner will be held about the 10th of June. Notice will be sent to every man who has signified his desire to be enrolled in the graduate class. Any man who has received no notice from the class and wishes to join can do so by writing to the Assistant Secretary, 10 Engineering A, Massachusetts Institute of Technology.— Course I. leads all the other courses in the number of Benedicts.— Rolf Newman was married to Miss Emma Gould Easton at St. John's Memorial Chapel, Cambridge, on February 18. Several '03 men were present. Swett assisted as usher. Newman and his bride are at present residing in Cambridge.— Haden was also married last June.— The following data give an idea where the fellows are located: S. C. Aldrich is with the Mianus Motor Works, Boston.— J. F. Ancona is draughtsman in the Bement-Niles Works (Philadelphia) of the Niles-Bement-Pond Company.— F. G. Babcock is mining coal at Scranton, Pa.— H. S. Baker is with the C. & N. W. Ry. (Evans-ton, Ill.).— S. K. Baker is with the United States Geological Survey (Arizona).— S. R. Bartlett is in the Southern office of Lockwood, Greene & Co. at Greenville, S.C.— W. W. Burnham is with the State Board of Health, Boston, Mass.— G. H. Clark is with the Stone Wireless Telegraphy Company, Boston.— R. A. Cook is with the Chicago & Alton Railway (Bloomington, Ill.).— C. B. Cox, United States Geological Survey, Spokane, Wash.— F. G. Cox, draughtsman for the Otis Elevator Company, New York.— H. Crosby is with the New York Shipbuilding Company, Camden, N.J.— J. A. Cushman, Metropolitan Water and Sewerage Board, Clinton, Mass.— W. H. Donovan is with the Sullivan Machinery Company, Denver,

Col.—W. O. Eddy is with the Orvington Manufacturing Company, Boston.—S. A. Foster is with the Consolidated Gas Company of New York.—W. M. Gilker, American Telephone and Telegraph Company, Pawtucket, R.I.—W. L. Gillett is with the General Chemical Company, New York.—E. G. Goodwin is with the Smuggler Union Mining Company, Telluride, Col.—L. B. Gould, with the New England Telephone and Telegraph Company, Boston, Mass.—I. T. Haddock, on a sugar plantation at Cienfuegos, Cuba.—J. E. Harlow is a draughtsman with the New York Shipbuilding Company, Camden, N.J.—G. M. Harris is with the Worumbo Manufacturing Company, Bath, Me.—R. F. Jackson is with Sturgis & Barton, Boston, Mass.—C. M. Joyce, with the Arlington Pyraline Company, Arlington, N.J.—P. J. Kearney, II., graduate student in electrical engineering at the Institute.—A. E. Lavy is with Cram, Goodhue & Ferguson, New York.—L. H. Lee is with the General Electric Company at Cheshire, Conn.—C. J. McIntosh is with the J. J. Case Threshing Machine Company, Racine, Wis.—R. C. Tolman is studying in Germany.

BOOK REVIEWS

ORE DRESSING

BY ROBERT H. RICHARDS. New York and London, 1903: The Engineering and Mining Journal. Two volumes, 1,236 pages, 560 illustrations, and 409 tables in the text. Price \$10.

The appearance of Professor Richards's book on "Ore Dressing" is an event of peculiar interest to all men connected with the Institute. Professor Richards has been identified with the Institute since its beginning, graduating with its first class in 1868, and being a member continuously since then of the instructing staff and Faculty. The mining laboratory, the first of its kind, was equipped in 1871, and has been under Professor Richards's direction since its inception. Working machines for the study and investigation of problems in ore dressing were introduced, and the present-day system of laboratory instruction and investigation, supplemented by observations at mines and mills in summer schools, was developed. The book on "Ore Dressing" is a part of this development, and the feature which characterizes the book more than any other is the extensive record of carefully observed facts, tabulated, analyzed, and interpreted in the most thorough, conscientious, and painstaking manner.

The first works on Ore Dressing were published in German, Gaetzschmann's "Aufbereitung" in 1864 and 1872, and Rittinger's "Lehrbuch der Aufbereitungskunde" in 1867. Since then other German works have appeared, by Linkenbach in 1887, by Bilharz in 1896 and 1898, and by Kirschner in 1898 and 1899. In French a small part of volume two of Haton de la Goupilliere's "Cours d'Exploitation des Mines," 1897, is devoted to this subject. The only work in English was Kunhardt's "The Practice of Ore Dressing in Europe," 1893. The subject of Ore Dressing, as represented by European practice, has thus had a very satisfac-

tory literature; but it had no comprehensive treatment in English and all the literature relating to American practice existed only in detached papers scattered through numerous technical journals. In the opening lines of his preface, Professor Richards says:—

In the use and design of machinery in all lines, America has, in the last few years, taken a leading place among the nations: that used in Ore Dressing is no exception to this rule. The existing authorities on this subject treat chiefly of European practice, and since the time of their publication new researches have been made, revising and throwing light upon the laws governing separation. On all these accounts, therefore, the present seems an opportune time for the appearance of a work on Ore Dressing.

The aim of the author has been to present to the reader the modern American practice, referring for comparison to the European; and to so expound the principles of the art, as at present understood, as to make advances easy in the future. In making the book, he has had in mind the student, the teacher, the expert, the mill man and the manufacturer.

The ground covered by the book includes the mechanical preparation of useful minerals other than coal.

The sources from which the information has been derived are: personal visits to the mills, correspondence with the mill men and the manufacturers of the mill machinery, the laboratory and the literature.

The brief statement in the last paragraph conveys little idea of the tremendous labor involved in exploiting the various sources of information. Continuously for ten years, Professor Richards has had one Institute graduate engaged in working on the book, and during a considerable part of that time two, and some of the time three Institute graduates. These men were employed in reviewing the literature, in assembling and classifying data, and in conducting experimental tests in the laboratory.

Of the books and periodicals referred to in the text, a list is given containing 174 titles. All the literature from 1870 to date has been systematically reviewed, and no less than 2,188 separate references to the literature are recorded in the text.

In the summer of 1895, accompanied by one assistant, Professor Richards spent three months in a systematic visit to mines and

mills throughout the West. The compilation of the data collected during this trip, followed by their discussion and revision, by correspondence with superintendents and mill managers, consumed more than four years.

During the progress of the writing, problems arose which were difficult to understand, and which seemed to require experimental work. Some of these were made the subject of extensive laboratory investigation, his assistants being employed sometimes for months at a time in laboratory experiment. Accounts of some of these investigations have appeared in papers before the American Institute of Mining Engineers, but many of them are published for the first time as a part of the book.

Professor Richards has done this work in addition to carrying on, without interruption, his regular work of administration and instruction in the Mining Department of the Institute, and that with constantly increasing numbers of students.

In the opening chapter on "General Principles" the subject of Ore Dressing is introduced in the following words:—

The preparation of ores for the smelter by mechanical means, whereby the valuable minerals are concentrated into smaller bulk and weight by the separation of some of the waste, or whereby two valuable minerals are separated from each other, is called Ore Dressing (*"Aufbereitung, Ger. ; Preparation Mechanique, Fr."*).

The advantages gained by concentrating the valuable minerals into a smaller bulk are : first, that the cheaper mechanical method of rejecting the waste material is substituted for the more expensive chemical method of the smelting furnace ; and, secondly, the rejected waste material is not shipped, and this saves freight. In the case of non-metalliferous ores, such as graphite, emery, and precious stones, the mechanical method is the only one available.

To illustrate the advantage of smelting a concentrated ore over direct smelting, let us assume an ore containing 8 per cent. of lead ; cost of mining, \$2 per ton ; concentrating, \$0.60 per ton ; smelting, \$9 per ton for mine ore and \$8 per ton for concentrates (in some cases concentrates are smelted without charge, particularly where they contain much iron) ; freight charges, \$1.50 per ton ; one hundred tons of ore concentrated into ten tons ; loss of metal, 15 per cent. in concentrating, 10 per cent. in smelting mine

ore, and 8 per cent. in smelting concentrates. Then the account for treatment by direct smelting will stand : —

<i>Cr.</i> Mining 100 tons ore at \$2 per ton	\$200.00
Freight on 100 tons ore at \$1.50 per ton	150.00
Smelting 100 tons ore at \$9 per ton	900.00
	<u>\$1,250.00</u>
<i>Dr.</i> Return from 14,400 pounds lead at $3\frac{1}{2}$ cents per pound	504.00
Balance of loss	<u>\$746.00</u>

The account for treatment by concentrating and smelting will stand : —

<i>Cr.</i> Mining 100 tons ore at \$2 per ton	\$200.00
Concentrating 100 tons ore at \$0.60 per ton	60.00
Freight on 10 tons concentrates at \$1.50 per ton	15.00
Smelting 10 tons concentrates at \$8 per ton	80.00
	<u>\$355.00</u>
<i>Dr.</i> Return from 12,512 pounds lead at $3\frac{1}{2}$ cents per pound	437.92
Balance of profit	<u>\$82.92</u>

If there was no freight to be paid in either case, there would still be a loss of \$596 on 100 tons of ore by direct smelting, while the combined processes would yield a profit of \$97.92.

Ore dressing makes use of the physical properties of minerals and rocks ; and the difference in behavior between the valuable and waste minerals affords methods for the separation of the former from the latter. Physical properties of interest in Ore Dressing are : —

Hardness.

Tenacity and brittleness.

Structure and fracture.

Aggregation.

Color and lustre.

Specific gravity and settling power.

Adhesion.

Greasiness.

Magnetism.

Change in condition by heat from non-magnetic to magnetic.

Change in mechanical condition by heat from dense to porous.

Decrepitation by heat.

A process usually consists of two or more successive steps, in which the later is supplementary to the earlier. Thus sorting in classifiers is followed by sizing on slime tables ; and sizing by screens is followed by sort-

ing on jigs. In each case the first step prepares the ore for the second, and the second supplements and completes the work which the first step was incapable of performing alone. Neither step is complete without the other.

Professor Richards divides this book into four parts: —

Part I. Breaking, Crushing, and Comminuting.

Part II. Separating, Concentrating, or Washing.

Part III. Accessory Apparatus.

Part IV. Mill Processes and Management.

Part I. Breaking, Crushing, and Comminuting.

The valuable minerals occur associated with and attached to the waste rock, and before any separation can take place the one mineral must be severed, detached or unlocked from the other, and this is done by one or more of the following means: blasting in the mine; calcining by fire; steam hammers; drop hammers; hand hammers; rock breakers; crushing rolls; steam stamps; gravity stamps; and the various fine grinders.

This part of the book occupies more than three hundred pages of text, and thus makes a good-sized book by itself. Particular attention is given to the breakers of the jaw and spindle classes for preliminary crushing, and to rolls, steam stamps, gravity stamps, and grinders for final crushing. A machine of each class and type is illustrated by figures accompanied by a detailed description, followed by a demonstration of its principles of action. The data collected from various mills visited is presented in tabular and analytical form for each type of machine which has come into considerable use. The tables for jaw and spindle breakers contain data collected at more than sixty mills, giving figures on sizes of machines; sizes of feed and product; actual and estimated capacities; power required; and costs of repairs other than of wearing parts. Other tables show, for the same machines, material and weights of new and old wearing parts; cost of new and selling value of old pieces; life of wearing pieces in days and tonnage; and actual gross and net wear and costs per ton of rock broken. A similar scheme is followed for each of the other crushing and grinding machines, and this part of the book is closed by a chapter on the laws of crushing.

Part II. Separating, Concentrating, or Washing

This part of *Ore Dressing* or "Concentration proper" has for its purpose the separation of the valuable minerals from the waste, or the separation of one valuable mineral from another, or both, by utilizing the various physical properties of the minerals that are available for those ends.

Separating, like crushing, generally divides into preliminary, final, and auxiliary work. The preliminary machines (log washers, screens, and classifiers) are, as a rule, unable to do finished work. They simply divide up the ore into a set of preliminary products which are well suited for treatment by the final or finishing machines (picking tables, jigs, vanners, slime tables, magnetic concentrators, etc.). These latter machines separate the valuable minerals from the waste, but they often yield middling products, needing further treatment. These middling products may be made up of either or both of two classes of grains: (1) "included grains," that is, grains in which particles of valuable mineral are attached to or included in particles of gangue; and (2) "unfinished grains," that is, grains which are composed wholly of valuable mineral or of gangue, but which have escaped separation owing to their shape or relative size.

This part of the book gives an exposition of machines and processes similar in its scheme of treatment to the section already described. It comprises 520 pages of text, different chapters being devoted to the preliminary washers, sizing screens, principles of screen sizing, classifiers, laws of classifying, hand-picking, jigs, laws of jigging, fine sand and slime concentrators, amalgamation, and miscellaneous processes of treatment.

Part III. Accessory Apparatus

Under this head a chapter comprising 43 pages of text is devoted to a description of the machines and apparatus that form connecting links between the different machines of the mill, and also those that control speed of running and value of product. They are bins, samplers, feeders, distributors, water regulators, conveyors, elevators, pumps, launders, unwaterers, and driers, etc.

Part IV. Mill Processes and Management

Introductory to this part of the book, Professor Richards says :—

Having discussed, individually, the various kinds of apparatus which find application in concentrating mills, there remains the consideration of the mills as a whole, including the various combinations of principles ; the different arrangements of apparatus ; the management of mills ; general items, such as power, water, costs, etc. ; mill testing and the selection of processes suitable for different ores.

The great variety of states of mineral aggregation existing in ores, which may indicate entirely different treatment for two ores of even identically the same composition, seems to make it necessary that this work should lay before its readers a great many mills, representing as great a number of variations as possible. In this way the intelligent reader will see how others have handled the various difficulties of their problems, will form his own opinions as to their virtues and faults, and will derive guidance for the solution of his own problems. With this aim in view, the following mill schemes are inserted.

These schemes of mill treatment occupy 200 pages of the book, and contain outlines of something more than 100 mills. They are arranged to show the relation of all the different machines in each mill, and the course of the ore through the mill. For the purpose of showing Professor Richards's method of presenting these data, the outline of one of these mills is reproduced below. This mill is one of the simplest, some of the schemes occupying several pages of print and showing the use and relation of as many as 60 machines.

Mill No. 3. Hell upon Earth, Joplin, Missouri. Capacity, 50 tons in 9 hours. The mill runs 9 hours per day, 6 days per week. The ore consists of the economic minerals blende and galena in coarse crystallization and a gangue of limestone and flint. The problem is to save the zinc and lead. Ore is hoisted to (1).

1. Receiving floor. The ore is shovelled to (2).
2. One Blake Breaker, 6 by 8 inches, to (3).
3. One pair of rolls, 12 by 14 inches, set $\frac{3}{4}$ inch apart. To (4).
4. Three No. 1 or roughing hand jigs. Top skimmings to waste ; middle skimmings returned to jig ; bottom skimmings to (5) ; coarse hutch to (5) ; fine hutch (sludge) from rear part of jig tank sold to sludge mill.

5. One No. 2 or finishing hand jig. Top skimmings to waste ; middle skimmings returned to jig ; bottom skimmings to (6) ; coarse hutch to (6) ; fine hutch (sludge) sold to sludge mill.

6. One No. 3 or lead hand jig. Top skimmings (blende) to market, middle skimmings returned to jig ; bottom skimmings (galena) to market ; hutch (galena) to market.

The labor required is 9 men : 3 on breaker and rolls, 3 on No. 1 jigs, 2 on No. 2 jig, and one on No. 3 jig. Wages are \$1.75 per day. The power is from a boiler running at 65 pounds pressure and burning 1 ton of coal per day. An engine with cylinder 8 by 12 inches, making 160 revolutions per minute, furnishes 25 horse-power for running the mine hoist, the breaker and the rolls. One hundred tons of ore yield 14 to 16 tons of zinc concentrates and 2 to 4 tons of lead concentrates.

The final chapter, entitled "General Ideas on Milling," is devoted to a discussion of principles governing the design, location, and running of mills, together with suggestions as to accounts, reports, and costs. Methods and apparatus for testing ores preliminary to the design of mills, and while running, to check the process, are fully described. This chapter is exceedingly practical, and covers a department of work of which Professor Richards speaks with particular authority.

The mill schemes are an exceedingly practical and valuable record of the actual conditions existing at the time of his visit to the mills in 1895, but it should be borne in mind that changes are of frequent occurrence ; and it is, indeed, a fact that many of these mills have been more or less changed. Some have been destroyed and rebuilt, and others have been superseded by the building of a new mill. Records of such progress will be made in later publications.

In the drawing of conclusions and the demonstration of principles Professor Richards has presented a remarkable amount of new material, which cannot fail to stand as permanent authority in the art of Ore Dressing ; but the space of this review permits only of mention of a few of the most noteworthy of these contributions. Since the appearance of Rittinger's book in 1867 there have been no more important contributions to the literature of Ore Dressing

than Professor Richards's studies of the laws governing the settling of particles in water. These investigations cover free and hindered settling, and include the modifying effects of pulsion and suction in the working bed of a jig. Most of his experimental data have been published in various papers before the American Institute of Mining Engineers, but, as now presented in the book, the discussions are entirely rewritten, and the applications of principles to the operation of classifiers and jigs are illustrated by data from many mills. The discussion includes considerations of the construction of jigs; materials for jig screens; and the purpose and adjustments of jigs, with particular analytical studies of mill data to determine the relation of size of grain treated to length and width of screens, length and number of plunger strokes, capacity, water requirements, and power. Classifiers are treated under a new and rational classification according to their principles of action; and working examples of the vortex classifier, recently invented and patented by Professor Richards, are fully illustrated and described.

Other new matter is introduced in the discussion of principles of roll-crushing; principles of screen-sizing; sizes and weights of ore for sampling; design of electromagnets for magnetic concentration; pneumatic concentration; absorption of amalgam by copper plates; and principles of vanner separation. In all of these discussions the author invariably follows his method of tying theory to practice with results that are exceedingly valuable and impressive.

Professor Richards has adopted a principle of treatment which he pursues consistently throughout his book. He refers to it very briefly in the preface in these words: "The student can intelligently study the theory of machines only after the construction and operation are understood. Therefore, whenever possible, the discussion of theory is given later than description." Those who have been in his classes appreciate how successfully he has applied the principle to his teaching, first giving the student personal experience with some operation, or putting a picture in his mind, before discussing general and theoretical considerations. The success and efficiency of this method of presentation cannot be too much emphasized.

The book will be of particular value to mining engineers, mill men, and manufacturers of machinery on account of its extended tables setting forth mill schemes, details of construction, and methods of operation of different machines and apparatus, and for the suggestions which are given for testing and improving mill work. Those parts devoted to breakers, rolls, and screen-sizing, will receive wider recognition on account of their value to other branches of engineering, particularly for their bearing on the crushing of stone for road metal, railroad ballast, and concrete. To the student in Ore Dressing it demonstrates principles, furnishes an authoritative exposition of the literature and practice of the day, and affords a basis for experimental investigation.

The two volumes were edited in Professor Richards's own office, and are remarkably free from errors. There is but one thing to regret, that the publishers have sought to save expense by printing on poor paper, with the result that not only are many of the figures and diagrams blurred, but the text frequently exhibits poor impressions. A book which cost the author so much in money, time, and strength, and which is of inestimable value to professional men, was deserving of better workmanship.

Professor Richards is to be congratulated on having finished his difficult and trying task, and in producing a book which is not only the best book ever written on Ore Dressing, but also one of the best reference and text books in any branch of industrial art or engineering. That he does not propose to rest in his labors is indicated by a paragraph in his preface, in which he calls attention to the constant development of the art of Ore Dressing and the many questions requiring investigation. He asks for criticisms, suggestions, and data, particularly in the direction of efficiency of crushing and concentration. He already has a quantity of new data collected during a second systematic visit to the mills in the summers of 1902 and 1903, and it is hoped that his other duties will permit him to publish this material soon, and without too great a strain on his health and strength.

W. SPENCER HUTCHINSON, '92.

ADVENTURES OF AN ARMY NURSE IN TWO WARS

Edited from the Diary and Correspondence of Mary Phinney, Baroness von Olnhausen, by James Phinney Munroe (M. I. T. 1882). Boston : Little, Brown & Co., 1903.

This is not a history or even a fragment of history. The subject and, to a large extent, author of this book was too impetuous, too plainly influenced by likes and dislikes, to write an impartial narrative. But the very defects of her nature are so evident that the reader is abundantly forewarned, and can make all due allowances for every extravagance of statement. Subject to this proviso, these experiences of an army nurse in our own Civil War and in the Franco-German War are especially interesting, and on almost every page throw suggestive sidelights on the history of the times with which they deal. It is perhaps more agreeable to paint the heroic and poetical side of war, but it is also well to read now and then a work like this, wherein are exhibited the prosy aspects, the anguish and suffering and desolation. It may be vain to hope that wars will ever entirely cease, but it is not, one may trust, too much to expect that the time is reasonably near at hand when many international differences which now are settled by needless sacrifices of life and health and treasure may be adjusted in other ways. Such books as the "Adventures of an Army Nurse" may help to bring home to individuals the horrors of war, and thus aid in securing at least a diminution of warfare, if not its absolute abolition. The last pages of the volume are particularly valuable in introducing the reader to an inside view of German life to which few foreigners have access.

C. F. A. C.